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Cotton the Great Crop of the South.

THE greatest commercial crop of the United States is cotton. The corn crop exceeds it in total value (Fig. 1), but much the greater part of that crop is consumed on the farms where grown, whereas all of the lint and most of the seed of the cotton crop is sold off the farms. In comparing crop values often only the value of the lint of the cotton is considered. The hay crops and the wheat crop are usually about equal to and sometimes greater in value than the lint of the cotton crop, but, including the value of the cotton seed, the cotton crop stands second only to corn. Although American mills consume about half the crop, the value of the exports of raw cotton usually exceeds that of the exports of any other crop.

Cotton is the great crop of the South. It is the chief and often almost the only source of income to a large proportion

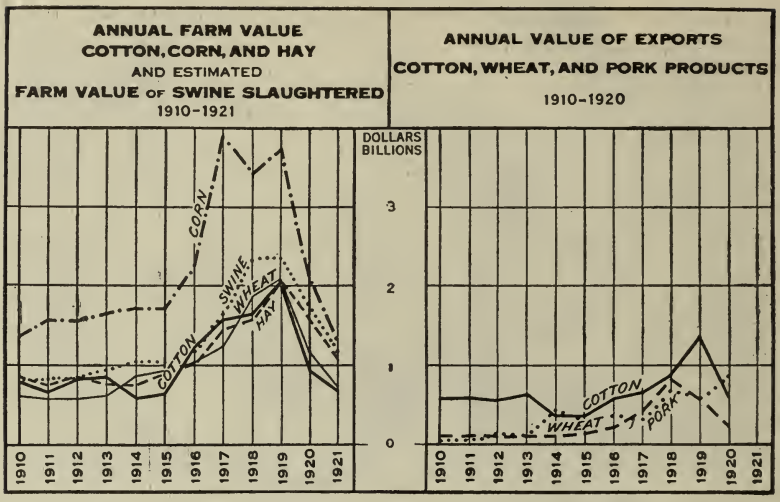


FIG. 1.—Note that cotton holds first place in exports but not in total value of the crop. Only the lint of the cotton is here included in the value of the crop. Adding the value of the seed, cotton would stand second to corn only in total value.

of the farmers in the Southern States. It is so important that low prices or any other factor which greatly reduces the profitableness of the crop greatly disturbs the economic life of the Southern States. When the cotton crop is good and brings good prices the South is prosperous.

There is a division of labor between the States of the North and those of the South by which the North depends upon the South for cotton clothing or the raw materials out of which to manufacture the clothing and for products of the cotton seed, and the South in turn buys many of the products of farms of the North. It follows, therefore, that when the South is prosperous it furnishes a good market for corn, flour, meat, and dairy products, and that a prosperous North makes a good demand for cotton and cotton products.

World Production.

Such a large part of the cotton crop is marketed abroad that the prosperity of the South also depends to a considerable extent upon the conditions of the foreign markets for cotton. It is important, therefore, to consider the world's supply of and demand for cotton.

The United States has been for many years the world's greatest cotton producer. India, China, Egypt, and Brazil are the most important competitive producers. Many other countries produce small amounts of cotton. (See Figs. 2 and 3.)

India.

Some cotton is grown in nearly all parts of India, but most of it grows in the western half of the country. As in the United States, there is a high degree of specialization in cot-

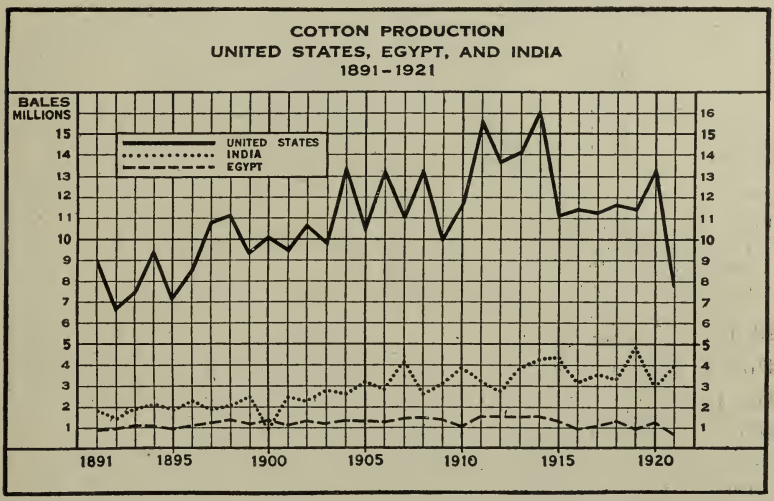


FIG. 2.—From 1891 to 1914 the cotton crops of Egypt, India, and the United States nearly doubled. The total crop of 1914 was the largest ever produced. Last year the crops in Egypt and the United States were the smallest in many years.

ton growing in some districts. The area devoted to cotton in India equals about two-thirds of the area planted in the United States, but the low yields per acre return a total crop about one-third as large. The production of India varies considerably from year to year, with a tendency to increase. The crop of 1919 was the largest yet produced. (See Fig. 2.)

Egypt.

The cultivable land in Egypt is limited to the Delta and a narrow strip along the Nile, of which nearly one-third is in cotton. The acreage is only about one-twentieth that of the United States, but large yields return a crop about one-tenth as large. The production of Egypt has declined since 1914 and in 1921 was the lowest in many years.

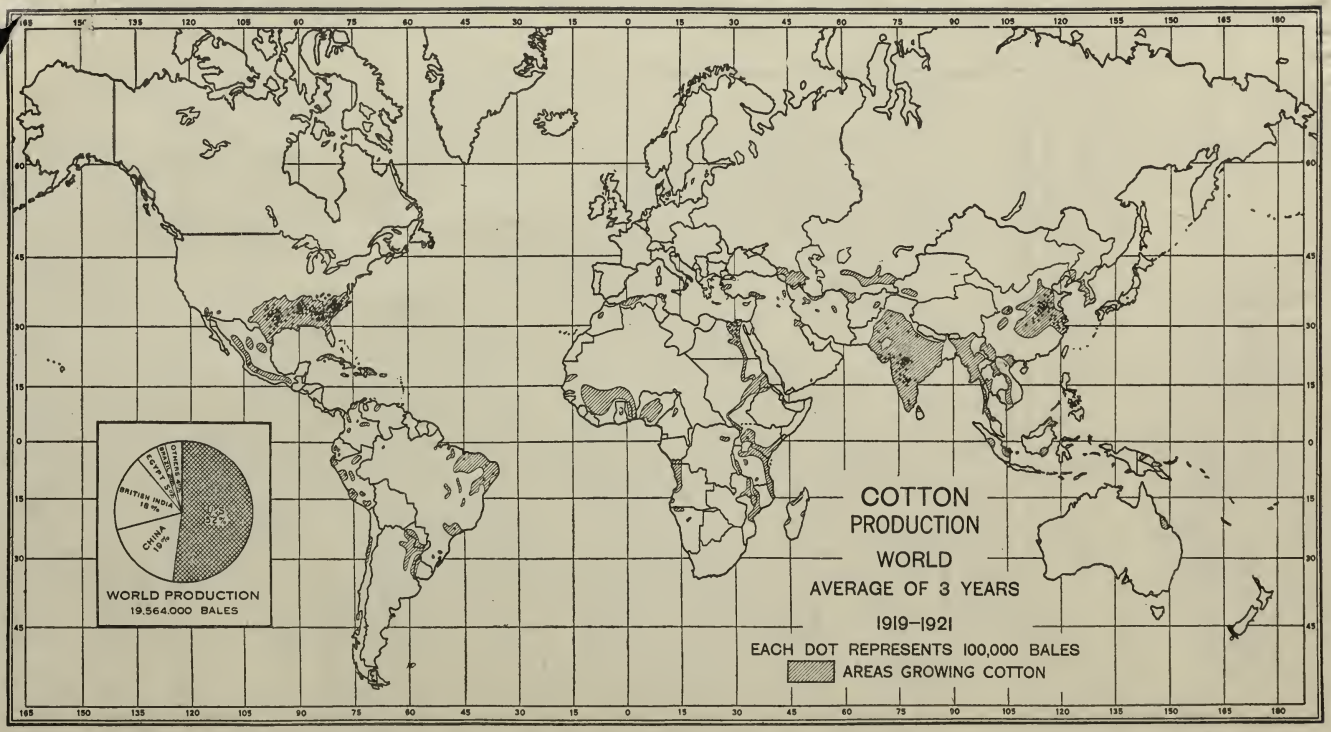


FIG. 3.—The United States produces over half of the world's cotton crop. The total crop of China is placed second by various estimates. In commercial production India is second. Cotton is grown in many parts of Africa and South America, but only in small quantities. Australia also grows a small quantity. Cotton requires a long season of warm weather for growth and proper maturity. Its latitudinal limits north and south fall between 35 and 45°, depending upon elevation and other conditions affecting the length of the frostless season.

South America.

Cotton grows as far south in South America as the twenty-eighth parallel, which includes the northern part of Argentina. Within the zone in which the plant thrives the area suitable for growing it is limited. In a large part of the zone the altitude offsets the effects of latitude and tempers the tropical climate so much as to exclude this crop. In other parts the rainfall is too heavy. Very little cotton is found in the Tropics, where the annual rainfall amounts to more than 60 inches. The chief cotton-producing regions are the drier eastern sections of Brazil and the coastal zone of Peru.

Some authorities believe that Brazil has an extensive potential area for cotton production. Quite recently production has developed rapidly in Sao Paulo, southeastern Brazil. In this region cotton must compete with the growing of coffee. Likewise an increase has occurred in the production of Argentina in recent years, but the total production of Argentina is still rather small.

China.

There are no authoritative statistics of production in China. Cotton production has developed rapidly in recent years, replacing the opium poppy in many regions. The known commercial crop exceeds 1 million bales. Since the domestic consumption is large, the total crop has been estimated to be about 4 million bales.

Principal Commercial Types of Cotton.

Wild species of cotton (Gossypium) are found in tropical regions of both hemispheres, and there are hundreds of cultivated varieties, differing in plant characters, as well as in the length, strength, and fineness of fiber. Thirty-eight principal commercial types are recognized at Liverpool, the chief cotton market of the world. A broad grouping into five general classes according to uses and commercial values is as follows:

(1) Sea Island cotton (*Gossypium barbadense*) is a native of tropical America. It has yellow flowers with purple spots, bolls mostly 3-locked, black seeds, fuzzy only at the ends, and very long, silky fiber. "Fancy Sea Island," grown on the islands and mainland along the coast of South Carolina, has a fiber 2 inches long, sometimes

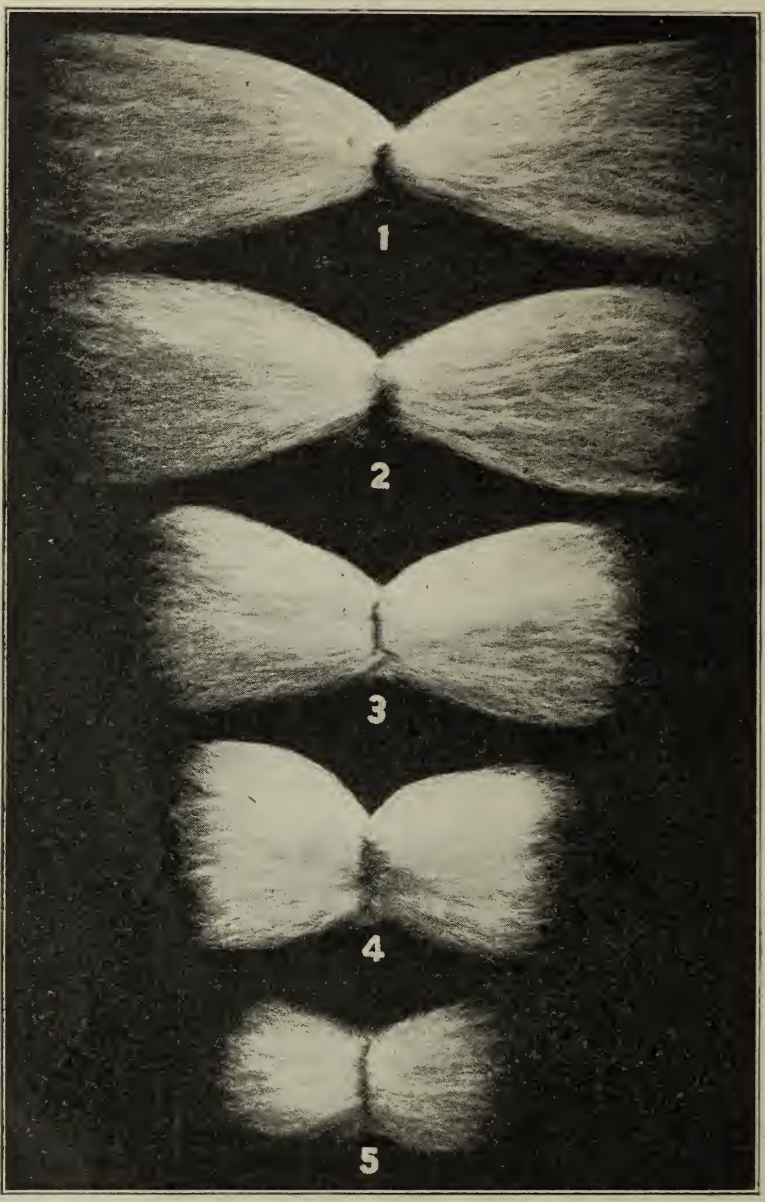


FIG. 4.—Principal commercial types of cotton. Combed lint of five important types: (1) Sea Island; (2) Egyptian; (3) upland long-staple; (4) upland short-staple; (5) Asiatic. (Natural size.)

even longer, and is the most valuable of the world's cottons, surpassing all other types in length, strength, and fineness. Most of the Sea Island crop, with a staple of 1½ to 1¾ inches, is grown farther inland in Georgia and Florida and is known commercially as "Floridas" and "Georgias." Before the coming of the boll weevil the average yearly production of Sea Island cotton in the United States was about 90,000 running bales, of which the fancy grades represented about one-tenth. Since the invasion of the boll weevil the production of Sea Island cotton has rapidly declined, and in the last few years the crop of the United States has been a failure. In 1920 production practically ceased, the crop amounting to less than 2,000 bales, whereas in 1916 the production was about 116,000 bales. The remainder of the Sea Island crop of the world, probably amounting to 10,000 bales, is produced mostly in the West Indies, principally St. Vincent, Barbados, and St. Kitts, and in Peru. (See staple No. 1, Fig. 4.)

(2) Egyptian cotton (*Gossypium barbadense*) is similar to Sea Island in the general appearance of the plants, and has a fine, silky, strong fiber. The staple is from 1 5/16 to 1¾ inches long, and is second in value only to the Sea Island. Egypt furnishes the bulk of the annual crop, averaging about 1,250,000 bales of 500 pounds each, of which from 150,000 to 350,000 bales have been exported to the United States. Egyptian cotton is also produced in the irrigated valleys of Arizona and California, the first commercial planting being made in 1912, although it was experimentally grown in this country many years before that time. The American industry has rapidly grown from a production of 7,000 bales in 1916 in the Salt River Valley of Arizona to a total in both Arizona and California of about 100,000 bales in 1920. (See staple No. 2, Fig. 4.)

(3) Upland long-staple cotton (*Gossypium hirsutum*), grown chiefly in the United States, occupies a commercial position between the Egyptian and the Upland short staples. The plants resemble those of the short-staple type, having unspotted white flowers, bolls 4 or 5-locked, and seeds usually well covered with white, brown, or green fuzz, in addition to the lint. The staple ranges in length from 1⅛ to 1¾ inches, and for some purposes competes with Egyptian. Most of the Upland long-staple crop of the United States is produced in the delta lands of Mississippi, in the Pecos and Red River Valleys of Texas, in Oklahoma, Arkansas, California, and South Carolina. The annual production is about 1,500,000 bales. (See staple No. 3, Fig. 4.)

(4) Upland short-staple (*Gossypium hirsutum*) constitutes about 92 per cent of the cotton crop of the United States and about 50 per cent of the world's crop of 20,000,000 bales. "American Middling," the standard short-staple grade, is the basis of price quotations for all short-staple cottons. The staple varies in length from five-eighths to 1 inch, with some varieties exceeding an inch when grown under the most favorable conditions. Hundreds of varieties are cultivated in the American Cotton Belt, differing in habits of growth, size of bolls, earliness of opening, abundance, length, and uniformity of staple. American Upland varieties have been introduced into

Russian Turkestan and Transcaucasia, and now constitute the major portion of the crop in those regions. They are also being grown in India, China, Chosen, Africa, Asia Minor, and Brazil. (See staple No. 4, Fig. 4.)

(5) Asiatic cottons include *Gossypium herbaceum* and several related botanical species, *indicum*, *neglectum*, and *arboreum*. The staple is short, often only three-eighths to three-fourths of an inch, but strong and rather rough. Asiatic cotton is grown in India, China, Asia Minor, Persia, Indo-China, and Japan, but in several districts is giving place to the American Upland type. The total volume of the crop is large but unknown, most of it being applied to domestic or local uses. (See staple No. 5, Fig. 4.)

Shifts in Cotton Production.

In the development of the United States the cotton crop has moved across the Cotton Belt from east to west. Areas have been tried out north of the areas in which cotton is now grown. Practically all possible available area for production in the United States has had a trial. Within the limits of suitable climatic conditions, production expands or contracts with changes in prices or in the profitableness of growing the crop. Shifts and changes in the distribution of the crop from 1839 to date are shown by Figures 5 to 9, inclusive.

In 1839 the cotton crop occupied only about half the area that it now occupies. Texas and the Indian territory west of Arkansas were not producing cotton. East of Texas all of the territory of the Cotton Belt had been opened to occupation by cotton planters and was being rapidly developed. The addition of large areas of new land that was well suited to the cultivation of cotton increased production so rapidly in the decade 1839–1849 that prices fell to a very low point. Notwithstanding low prices, production increased 50 per cent. Prices were better during the decade 1849–1859, and production continued to increase in all parts of the Cotton Belt, the greatest gains being made in the Southwestern States. In this decade Texas and Arkansas began to contribute to the annual crops of the United States. In this and the preceding decade, railroads were constructed from the coast to the interior in North Carolina, South Carolina, Georgia, and Alabama, increasing the transportation facilities and thereby encouraging the further development of cotton production in the interior of these States.

The blockade during the Civil War temporarily ruined the cotton industry of the South. During the war some cotton

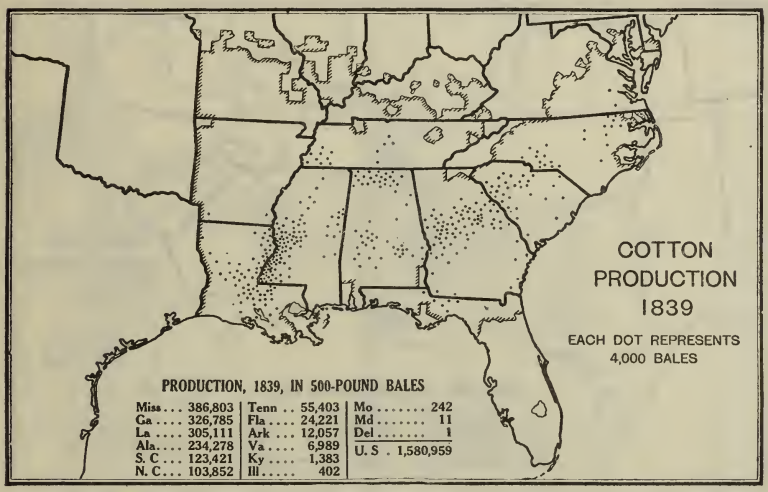


FIG. 5.—More than three-fourths of the cotton crop of 1839 was grown east of the Mississippi River. Mississippi was the leading State and Georgia next. Several counties in Illinois and Missouri reported cotton.

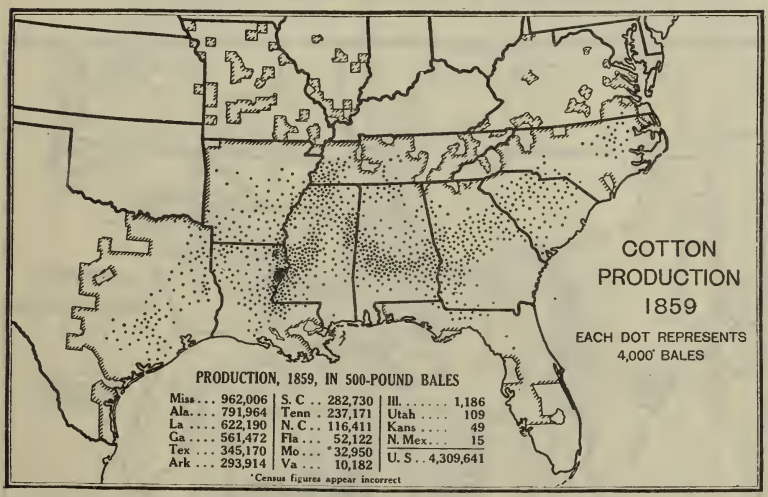


FIG. 6.—There was a great shift in area and a great increase in production between 1839 and 1859. The black prairie of Alabama and Mississippi and the alluvial lands along the Mississippi contributed largely to the increase in production. New territory was added in eastern Texas;

was produced, but for the most part agricultural activities were diverted to the production of food. In 1865 the South

was again free to return to a high degree of specialization in cotton. The recovery of production was necessarily slow.

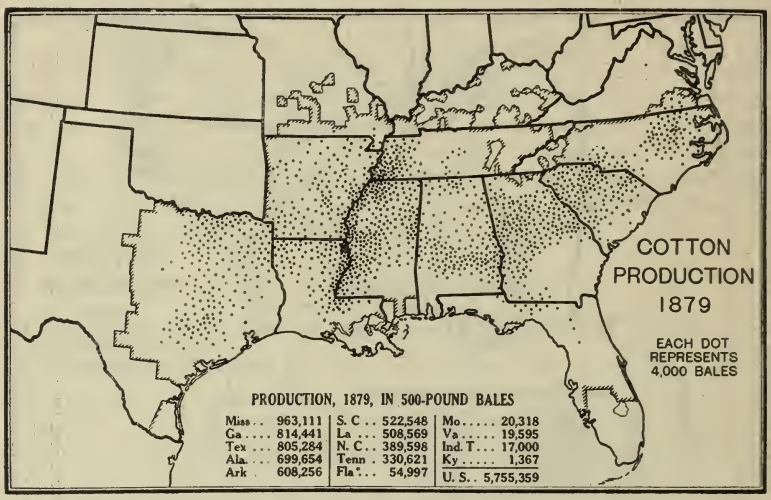


FIG. 7.—By 1879 production had practically recovered from the effects of the Civil War. It had shifted farther westward in Texas and Indian Territory. In the East the effects of the use of fertilizers on the upper Coastal Plain and Piedmont began to show in increased production.

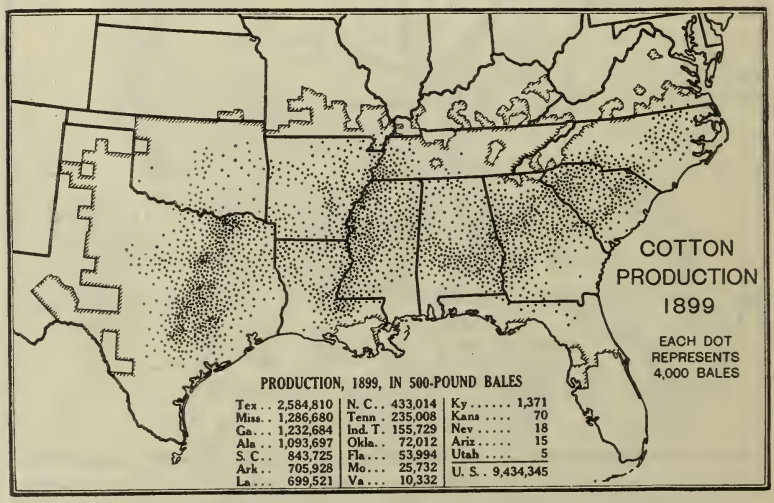


FIG. 8.—Texas trebled her crop between 1879 and 1899. In the East production continued to increase with the use of more fertilizer. At this date the boll weevil had begun to operate in Texas but had covered very little ground. (See Fig. 23.)

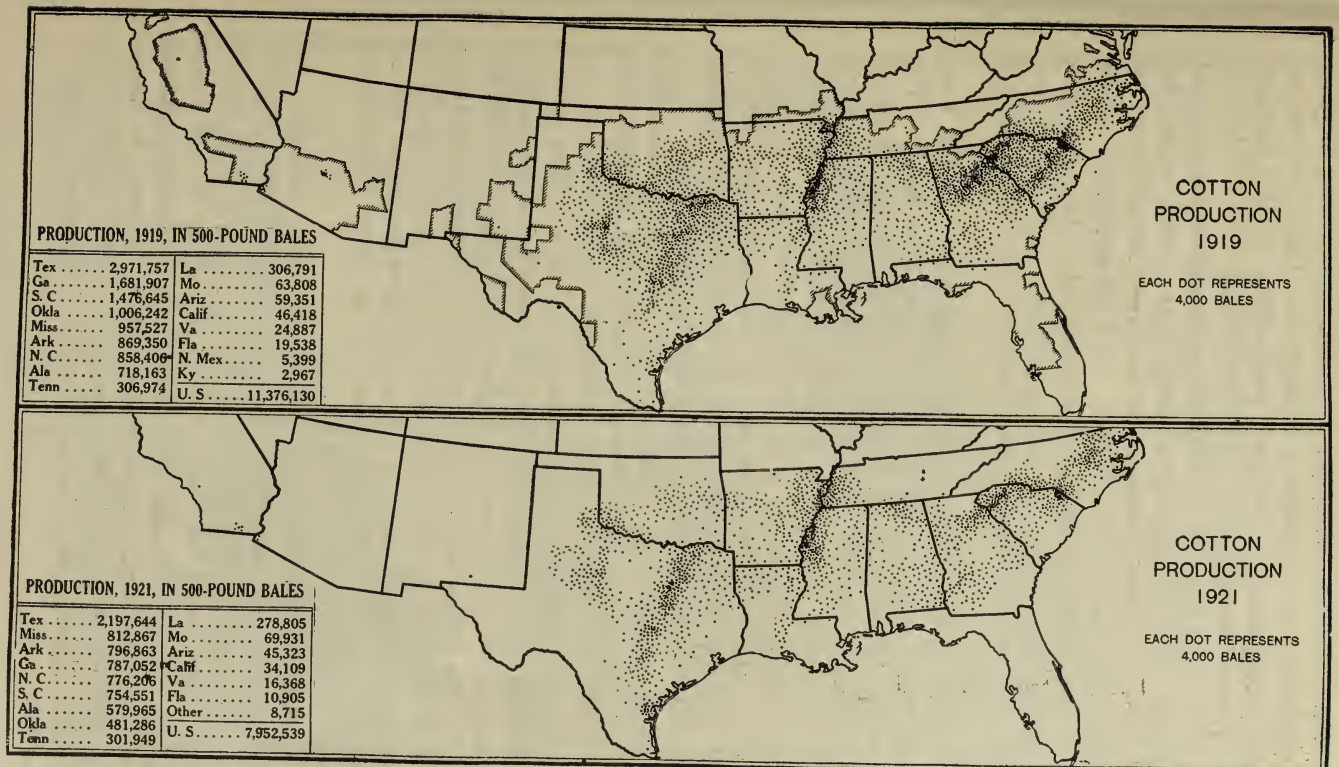


FIG. 9.—The upper part of this figure was made from census returns for 1919, the lower part from ginners' reports for 1921. The differences in the States east of New Mexico between 1899 and 1919 are largely owing to the activities of the boll weevil, which is more destructive in the southern parts of the Cotton Belt than in the northern parts. The lower map shows what parts of the Cotton Belt lost most heavily last year.

The crop of 1866 was less than 2 million bales, which was less than half that of 1859 and a little greater than the crop of 1839. High prices stimulated production by the farmers along the northern border of the Cotton Belt and in Arkansas and Texas. It was not so difficult to reorganize agricultural activities where the farms were small and worked largely by white labor as it was to reorganize the large plantations which had been worked by slave labor. By 1879 conditions in the South were fairly stable again, and the crop of that year was the largest that had ever been produced. All the States, except Alabama and Louisiana, produced more cotton in 1879 than in 1859.

Production doubled between 1879 and 1898. In the West the increase in production was largely from new lands. The expansion of railroads in Texas was followed by the rapid development of cotton production in the Black Waxy Prairie region, grazing and grain farming giving way to cotton. Production in Arkansas and Oklahoma had also increased greatly. In the East there was an increase in production, largely as the result of the extensive use of fertilizer on sandy soils and of improvements in methods of production.

The development of Oklahoma and western Texas added a large acreage to the cotton-producing area between 1899 and 1909. The total acreage increased 32 per cent in the decade and continued to increase up to 1914. This period is marked by the spread of the boll weevil, by the intensification of efforts to produce higher yields and better qualities, by the introduction of cotton into the irrigated districts of southern California and Arizona, by the great increase in the value of cotton seed, by the rapid development of cotton manufacturing in the South, and by increased competition from foreign countries.

Since 1914 production of cotton has been reduced considerably by the ravages of the boll weevil. The crop of 1919 was only a little larger than the crop of 1909, which was a short crop for that period. The crop of 1921 was greatly reduced by the boll weevil and was the shortest crop that has been produced since 1895. It may be noted that the heaviest reductions were made in the regions most recently infested by the boll weevil. (Compare Figs. 9 and 23.)

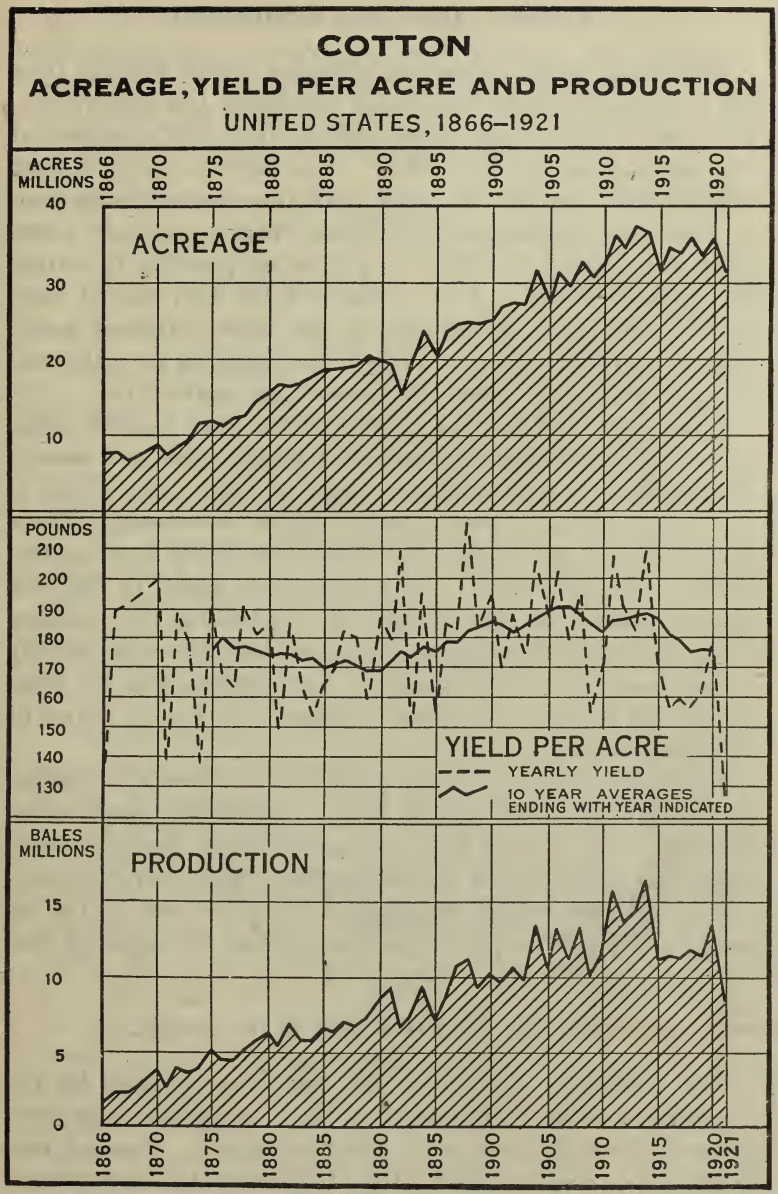


FIG. 10.—The acreage of cotton expanded rapidly from 1866 to 1913. The trend since 1913 has been downward. The yield per acre varies greatly from year to year, the trend was upward from 1890 to 1907 and has been downward since the latter date, and last year was the lowest recorded. The crop of last year was the smallest since 1895.

Acreage, Yield, and Production.

Beginning with the earliest date for which acreage data are available, the area of cotton harvested has quadrupled. The very rapid increase from 1866 to 1880 was a process of recovering after the Civil War. The rapid expansion from 1893 to 1911 was for the most part an expansion westward in Texas and Oklahoma. In recent years a tendency seems to be developing to maintain a level or possibly to reduce the area in cotton. The ravages of the boll weevil have caused reductions in acreage in the worst infested areas. These reductions have been offset by expansion of cultivated areas in which the weevil has been less destructive.

Yields per acre fluctuate greatly from year to year. The average for 1921 was the lowest of which there is a record. The trend of yields was downward to 1890, after which it was upward for 16 years, and is again downward. Three major factors in the trend of yields are shifts in area, fertilizers, and boll weevil. The downward trend in the first period noted was due largely to expanding low-yielding areas, the upward tendency, developed later, was due largely to increased use of fertilizers in some States, and the later downward tendency is caused primarily by the activities of the boll weevil.

Production fluctuates with yields and follows a composite trend between acreage and yield. Unusually large areas planted from 1910 to 1914 and good yields produced very large crops, the crop of 1914 being the largest ever produced. Since 1914 the crops have averaged about the same as for the period 1904–1909, and last year's crop was the smallest produced since 1895.

Diversification of Crops in the South.

The averages of crops in the South as reported by the censuses of 1880–1921, inclusive, show no decided tendency toward diversification until the last decade. Several new crops have come into the South in this period and now occupy considerable areas. The area sown to rice has increased over 50 per cent but is still a small percentage of the total cultivated area. In recent years peanut growing has developed some importance. Soy beans and cowpeas are comparatively

new crops in the South. Kafir and milo are new crops in Oklahoma and Texas. The total acreage of all these new crops compared with the total acreage of cotton or corn is not very great, but together with all other crops they now make up about one-third of the total crop area.

Changes in acreages of selected crops in the cotton-growing States, 1879–1919.

	Number of acres, 000 omitted.					Per cent of total acreage of principal crops.				
	1919	1909	1899	1889	1879	1919	1909	1899	1889	1879
Rice	779	610	342	161	174	0.8	0.7	0.5	0.3	0.4
Kafir, milo, maize, etc	2,635	1,108	86	.....	.....	2.7	1.4	.1	.....	.....
Hay—tame or wild grasses	4,360	3,518	1,950	1,543	454	4.5	4.4	3.0	3.2	1.1
Annual legumes—hay	1,339	.....	.....	.....	.....	1.4	.....	.....	.....	.....
Sorghum kafir—forage	2,566	1,148	749	.....	.....	2.7	1.4	1.1	.....	.....
Peanuts	913	724	398	143	.....	.9	.9	.6	.3	.....
Total	12,592	7,108	3,525	1,847	628	13.1	8.8	5.3	3.9	1.6

Locally marked changes have taken place in the relative acreages of the different crops. The destructive activities of the boll weevil have been an important factor in bringing about these changes. The acreage of cotton in Georgia in 1919 was considerably below the acreage of 1909. The reduction in cotton acreage here was offset largely by an increase in the acreage of corn. There was a considerable increase in the acreage of hay, especially

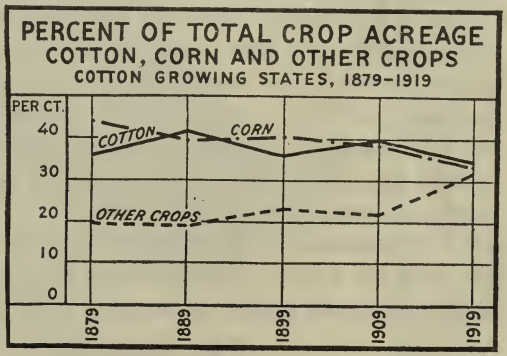


FIG. 11.—From 1909 to 1919 the percentage of land cultivated in crops other than corn and cotton in the Southern States increased considerably.

legume hay, otherwise there were no very significant changes. Similar but even more striking changes have taken place in Mississippi. In a few States cotton has increased in importance, offsetting, in a measure, the decline in the relative importance of cotton in the States which have been seriously affected by the boll weevil.

In the last year, 1921, there seemed to be every reason for reducing the acreage planted to cotton and increasing the acreage planted to corn. According to the latest estimate, the result was a reduction of the cotton crop for 1921 to approximately the acreage for 1915, a total reduction from 1920 of about 10 per cent. The high freight rates on corn from the North encouraged the increase in corn production. For a long time we have had this swinging from corn to cotton and from cotton to corn, maintaining a relation of about 50 to 50 between them.

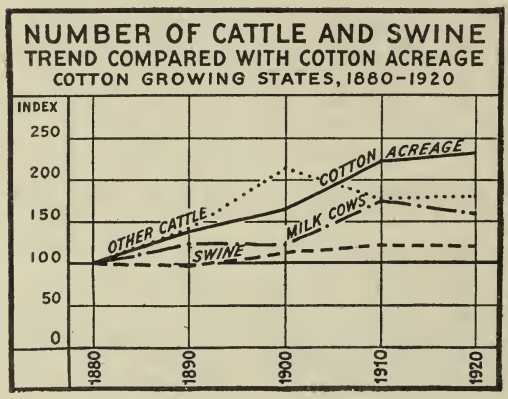


FIG. 12.—Census returns of live stock are not strictly comparable from date to date. The figures available indicate that live stock has not increased as rapidly as the acreage of cotton.

The number of live stock in the cotton-producing States has increased in the last 50 years, but not as rapidly as has the area planted to cotton. The number of cattle doubled and the number of swine increased about 25 per cent. The increase in live stock is supported by the increase in tame grass and legume hay. It is difficult to compare exactly the last two censuses. The change in number between the last two decades seems disappointing to one who believes that the South would profit by keeping more live stock.

The Cotton Belt.

The term "Cotton Belt" as it is generally used applies to that area of specialized cotton production in the South extending from the Atlantic coast through North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi,

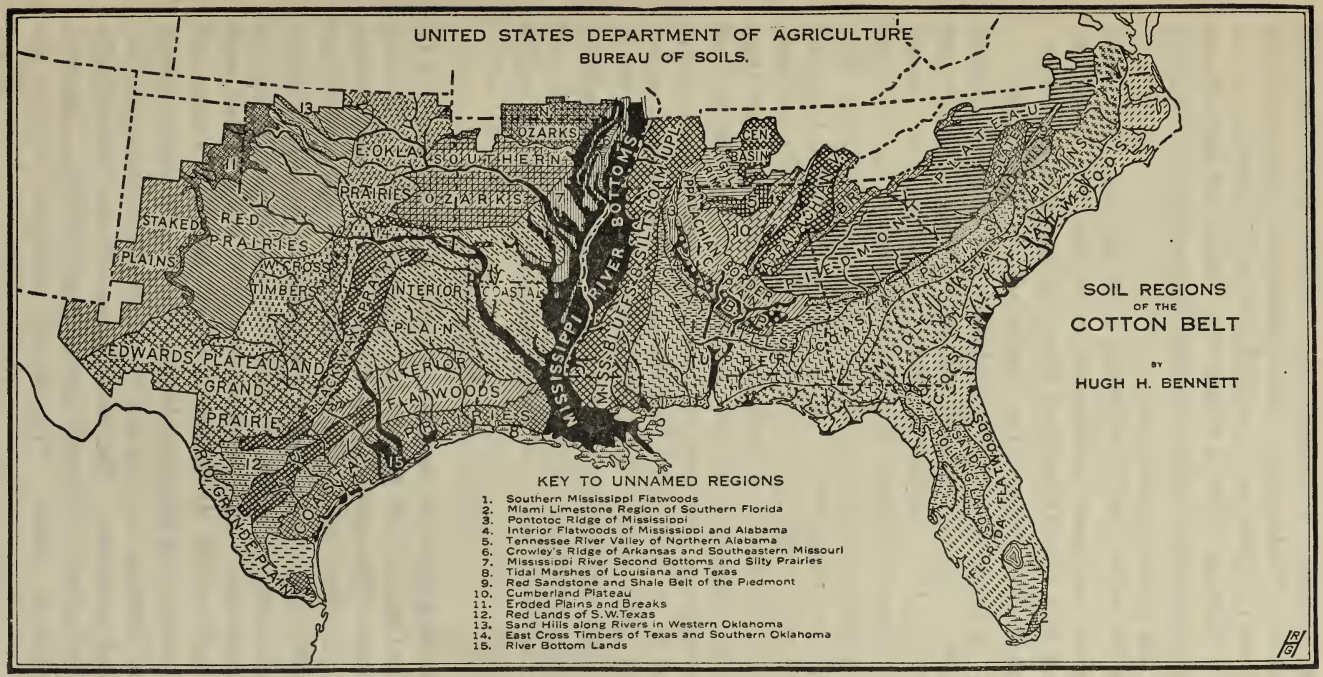


FIG. 13.—Excepting in southern Florida, only cotton-growing counties of some importance are included. Compare Figures 13 and 9 and note the distribution of cotton production in relation to soils. The most productive soils are the bottoms of the Mississippi and tributary rivers, the black prairies of Alabama, Mississippi, and Texas. Fertilizer makes the upper Coastal Plain and the Piedmont Plateau of Atlantic Coast States very productive.

Arkansas, western Tennessee, and northern Louisiana, and into Texas and Oklahoma. The densest production of cotton is found on the soils most suitable for its production in the center of this belt. (Figs. 9 and 13.) Both soil and climate are very important factors in the determination of areas suitable for cotton production.

About two-thirds of the Cotton Belt consists of a broad coastal plain, composed principally of sedimentary materials, bordering and largely derived from two ancient and much-eroded mountain masses, the Appalachian Highlands (including the Piedmont) in the east and the Ozark Highlands in the west. From these highland areas rivers radiate across the coastal plain, bordered, especially along their lower courses, by swampy flood plains often several miles wide; and in the broad depression between these two highlands the Mississippi River flows southward, dividing the Cotton Belt into an eastern and western section approximately equal in area, in acreage of improved land, and in production of cotton. Beyond the boundary of the coastal plain the Cotton Belt includes northern and western marginal regions, comprising a portion of the Piedmont Plateau and of the valleys associated with the Cumberland Plateau and Blue Ridge Mountains in the east, together with the valleys of the southern Ozarks (Ouachita and Boston Mountains) and a portion of the prairies and great plains of Texas and Oklahoma in the west.

Soils of the Cotton Belt.

Cotton is grown on practically all well-drained types of soil in the Cotton Belt, but a comparison of the map showing distribution of production with the map showing soils brings out the fact that certain types of soil seem to be much more suitable for cotton production than other types. (See Figs. 9, 13.) The most productive soils in a normal season are the dark-colored clay lands, particularly those rich in lime, such as the black prairies of Alabama, Mississippi, and Texas, and the red, brown, and black well-drained river bottom land and the second bottoms such as are found in the Mississippi, Tennessee, and Arkansas. The sandy loams of the Coastal Plain and the red subsoil Piedmont lands, when fertilized, also give high yields of cotton. The use of fertilizer permits the growing of cotton on light sandy land which would other

wise give yields too low to be profitable. The red prairie of Texas and Oklahoma east Oklahoma prairie and that part of the Grand Prairie and Edwards Plateau of Texas are also productive soils, but in western Oklahoma and Texas the yields of the crops are frequently reduced by drought. (For detailed description of the soils shown on the map on page 339, see Atlas of American Agriculture, cotton section.)

Climate of the Cotton Belt.[1]

Although the most noticeable differences in the density of cotton acreage and variations in yield per acre within the Cotton Belt are due principally to soil conditions, the outer boundaries of cotton production are determined almost entirely by climatic factors. The Cotton Belt has an average summer temperature of 77 degrees along the northern boundary. This temperature appears to be the limit, beyond which commercial production becomes unprofitable. In the southern portion of the Cotton Belt the summer temperature is 80 to 85 degrees. Along the northern margin of the Cotton Belt the last killing frost in spring occurs on an average about April 10, and the first killing frost in fall about October 25, so that the frostless season is about 200 days. In the southern portion of the Cotton Belt the last killing frost in spring occurs about March 10 on the average, and the first killing frost in fall seldom before November 25, the frostless season being 260 days or more in length.

The average annual precipitation in the Cotton Belt ranges from 23 inches in western Oklahoma and Texas to 55 inches in eastern North Carolina and 60 inches in southern Mississippi, but throughout much of the belt is between 30 and 50 inches. The spring rainfall ranges from 6 inches in western Texas to 16 inches in Arkansas and southern Mississippi, being heavier in the Mississippi Valley States than in Texas or the South Atlantic States. The summer rainfall is somewhat greater than that of the other seasons, especially in the southern and eastern portion of the belt, reaching a maximum of 20 inches in southern Mississippi and in eastern North and South Carolina, while in the black prairie region of central Texas the amount received averages only 8 inches. Autumn is the driest season of the year, practically all the

[1] Taken from the "Cotton" section of the Atlas of American Agriculture, page 9.

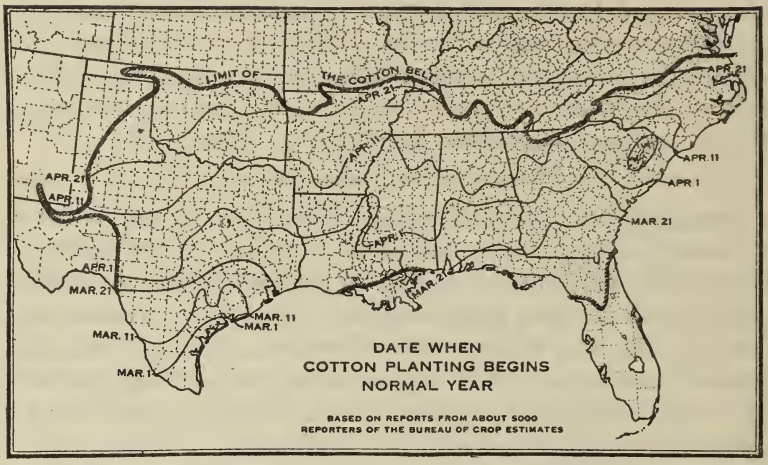


FIG. 14.—In southern Texas planting begins about March 1, and the date becomes later going north to the northern border of the Cotton Belt, where it begins about April 21. The planting of cotton begins generally about 10 to 20 days after the last killing frost in spring.

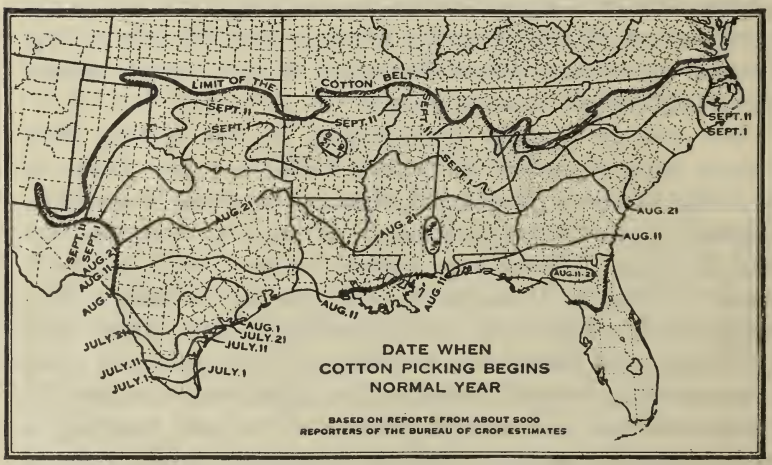


FIG. 15.—Cotton picking begins early in July in southern Texas. Through the center of the Cotton Belt it begins in the latter part of August and along the northern border not until about September 11. The southern part of the Cotton Belt has a long picking season, but along the northern border the cotton must be picked as early as possible to escape the frost.

important cotton regions receiving less than 10 inches of rain during the fall months. February and November are the wettest months in the Mississippi Valley States, in Alabama, and in northern Georgia. August is the wettest month in the Carolinas and May in Texas and Oklahoma. October and November are the driest months throughout practically the entire Cotton Belt.

Crop Combinations in the Cotton Belt.

The high degree of specialization in cotton production in the Cotton Belt is in part explained by three things: First, the world demand for cotton is great, and the areas having especially favorable climate and other conditions are restricted. Second, cotton provides rather steady employment for labor from early in the spring to a little beyond the middle of the summer and from early fall to early winter. In fact, it provides so fully for the employment of labor throughout the season that a cotton farmer usually chooses his other crops more with a view to making the business and home partly self-sufficing than he does with a view to providing profitable employment for labor at times when cotton does not require attention. (See Fig. 18, seasonal distribution of labor.) Third, cotton is marketed direct—that is, it is not disposed of through live stock. If it were a crop to be fed, a farmer would in all probability need to give more attention than he does to the production of other crops which would be supplementary from the standpoint of caring for live stock. As it is, he produces forage and grain crops mainly for a few head of work stock. Considering these things, it is not surprising that cotton farmers are not inclined to produce more corn, sorghum, oats, cowpeas, peanuts, sweet potatoes, etc., than they themselves can make good use of in the course of producing and marketing cotton.

The accompanying map (Fig. 16) shows the Cotton Belt divided north and south and east and west on the basis of certain differences in the choice of crops grown with cotton. The line drawn north and south through Oklahoma and Texas indicates where corn begins rather definitely to give way to kafir and other grain sorghums. But for the dryness of the climate to the west of this line, corn would hold its place on cotton farms throughout the Cotton Belt.

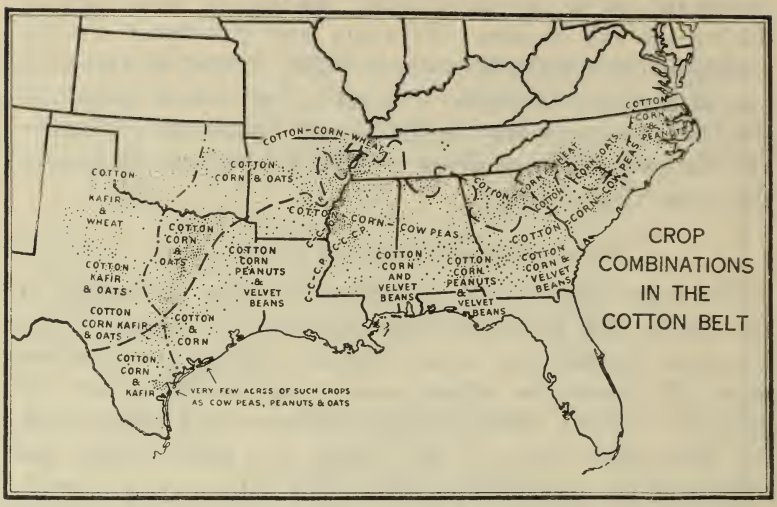
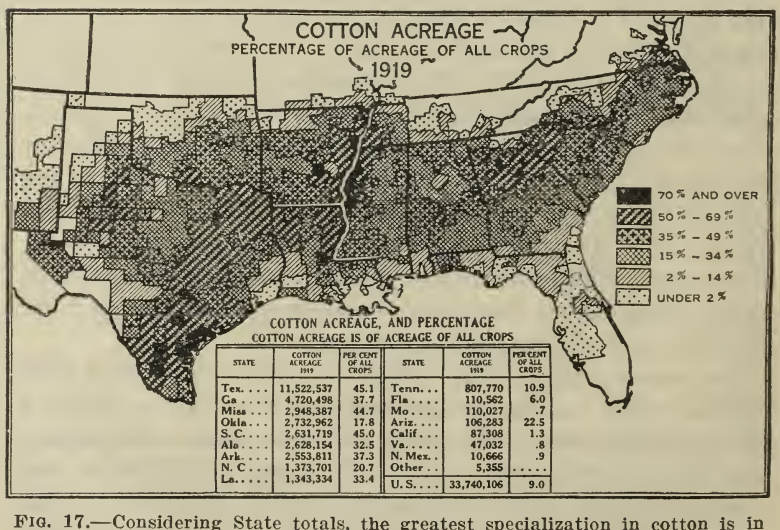


FIG. 16.—North of the line drawn through the Cotton Belt from Virginia on the east down through the Southern States and extending to the Mexican border on the west wheat and other small grains appear in the cropping system. South of this line small grains do not appear, their place being taken by leguminous crops. Another line drawn from the Kansas border across Oklahoma and Texas separates the kafir-producing area from the corn-producing area.



COTTON ACREAGE, AND PERCENTAGE
COTTON ACREAGE IS OF ACREAGE OF ALL CROPS

STATE	COTTON ACREAGE 1919	PER CENT OF ALL CROPS	STATE	COTTON ACREAGE 1919	PER CENT OF ALL CROPS
Tex.	11,522,537	45.1	Tenn.	807,770	10.9
Ga.	4,720,498	37.7	Fla.	110,562	6.0
Miss.	2,948,387	44.7	Mo.	110,027	.7
Okla.	2,732,962	17.8	Ariz.	106,283	22.5
S. C.	2,631,719	45.0	Calif.	87,308	1.3
Ala.	2,628,154	32.5	Va.	47,032	.8
Ark.	2,553,811	37.3	N. Mex.	10,666	.9
N. C.	1,373,701	20.7	Other	5,355	.....
La.	1,343,334	33.4	U. S.	33,740,106	9.0

FIG. 17.—Considering State totals, the greatest specialization in cotton is in Texas, with South Carolina second and Mississippi third. In several areas over 70 per cent of all the land in crops is in cotton. The largest area of this kind is along the Mississippi River in Mississippi and Arkansas.

North of the line running east and west through the Cotton Belt the acreage of small grains (wheat, rye, etc.) exceeds the acreage of large - seeded annual legumes (cowpeas, peanuts, velvet beans, etc.). South of the line the acreage of large - seeded annual legumes exceeds the acreage of small grains. The choice of the small grains in the northern division of the Cotton Belt tends to be wheat to the north and oats to the south. The oats are sown in the autumn instead of the spring as in the North. In the southern division of the belt, where crops like cowpeas, peanuts, and velvet beans are more

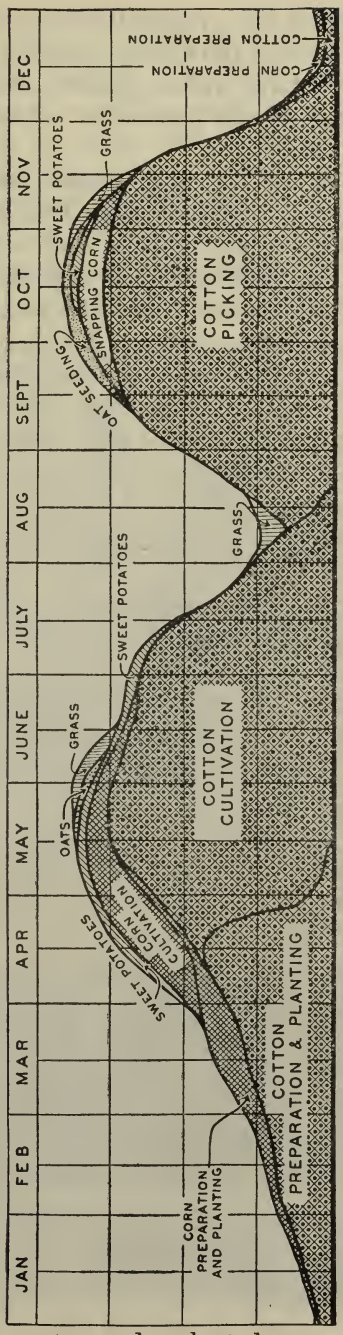


FIG. 18.—The periods of slack work come in midsummer—July and August—and in midwinter—December and January. No crops are grown on which labor can be utilized during these periods of slack work. Of course, in the farthest South winter vegetables can be grown in the slack winter period. Some grass harvest comes in August, but it is not important. The picking season is the limiting period for labor on cotton. At the same time corn should be snapped, oats should be seeded, sweet potatoes dug, and grass harvested. It is not surprising, therefore, that where cotton is a very profitable crop these other crops may not receive much attention.

important, oats are practically the only small grain grown. This lower part of the Cotton Belt lies almost wholly within the Coastal Plain, where climatic conditions generally are less favorable to the production of small grains than they are farther north.

The choice of the large-seeded annual legumes in the southern division of the Cotton Belt tends to be cowpeas in the Mississippi River bottoms and to the east along the upper part of the Coastal Plains, peanuts and velvet beans elsewhere between eastern Texas and southeastern Georgia, and peanuts alone in northeastern North Carolina and southeastern Virginia. The share of land allotted to these crops in the Coastal Plains of southern Texas is almost negligible. In the northern division of the Cotton Belt, where the small grains are more important, a little land is allotted to cowpeas and peanuts, but very little to velvet beans.

General Farm Practices.

Time and method of preparing land, of planting, cultivating, picking the cotton, and the cost of preparing it for market vary much in different parts of the South. Probably in most cases the causes of the differences are not to be found only in the different customs; there are also physical and economic reasons for the differences.

FIG. 19.—One-mule plow in Southeast.

Wherever crab grass, Johnson grass, and other weeds grow profusely in the fields the cultivation of cotton requires from one to three hoeings per season. With one mule a man can plow, chop, and hoe from 10 to 20 acres, from which 5 to 10 bales of cotton are produced, and this is ordinarily all one family can pick. Therefore, one-mule implements are used over the greater portion of the eastern part of the Cotton Belt. In some sections the topography of the land would make the use of larger implements difficult. In the level, black lands of Texas, however, where,

FIG. 20.—Two-mule plow in Texas.

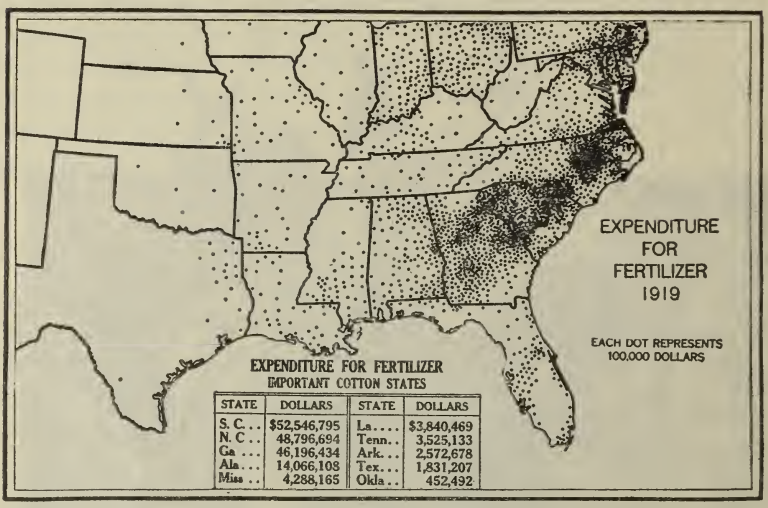
owing to the smaller amount or absence of crab grass, the hoe work is comparatively small and where transient labor can be obtained to pick the cotton, 4-mule implements are frequently used in preparing the land and 2-mule implements in cultivating it.

The newest form of cotton cultivation in the United States has developed in the irrigated districts of the Southwest. Here the essentially distinctive features are leveling the land so that the entire field may be irrigated uni-

formly and regulating the water so as to produce the desired results in producing the cotton. Another special kind of culture is used in producing the sea-island cotton of South Carolina and Georgia.

Fertilizers.

Commercial fertilizers are extensively used in the production of cotton in the Southeastern States. (See Fig. 21.) Comparing Figure 21 with Figure 13, the heaviest use of fertilizers is seen to be on the soils of the Coastal Plains of



STATE	DOLLARS	STATE	DOLLARS
S. C. ..	$52,546,795	La....	$3,840,469
N. C. ..	48,796,694	Tenn..	3,525,133
Ga	46,196,434	Ark...	2,572,678
Ala...	14,066,108	Tex...	1,831,207
Miss ..	4,288,165	Okla..	452,492

FIG. 21.—Distribution of the expenditure for fertilizers as reported by the census of 1919. The heaviest use of fertilizers is on the Coastal Plain and Piedmont of the Carolinas and Georgia. Very little is used west of Alabama. Compare the distribution of expenditures for fertilizers with distribution of cotton production (Fig. 9).

North Carolina, South Carolina, and Georgia, and also to a considerable extent upon the soils of the Piedmont of these States.

The fertilizers most generally used consist of acid phosphate, kainit, muriate of potash, and nitrate of soda. In many regions the greatest outlay of cash in producing the crop is for the fertilizers. After labor, it is the most important factor in the cost of producing cotton in these Eastern States.

Cotton Pests.

The Boll Weevil.

The original home of the boll weevil appears to be the plateau region of Mexico or Central America. Previous to 1892 the insect had spread through much of Mexico. Little is known, however, concerning the extent or rapidity of dispersion. About 1892 the weevil crossed the Rio Grande near Brownsville, Tex. Whether it flew across or was transported in some way is not known. By 1894 it had spread to

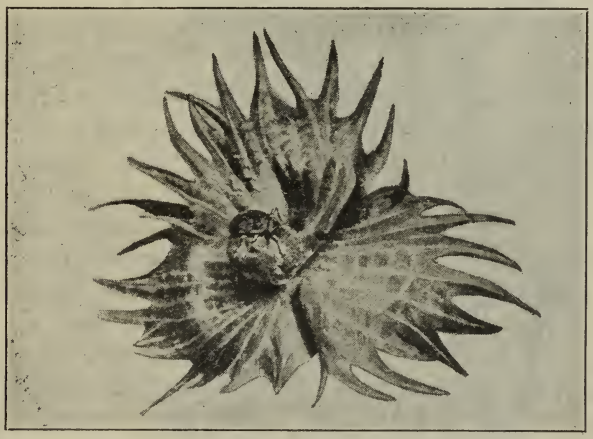


FIG. 22.—Cotton boll weevil puncturing young flower bud. (Natural size.)

half a dozen counties in southern Texas. Since 1894 it has extended its range annually from 40 to 160 miles, although in several instances the winter conditions have been such as to cause a decrease in the infested area. (See Fig. 23.)

Outside of the United States the boll weevil is known to occur throughout the larger portion of Mexico and southward to Guatemala and Costa Rica. It is known to occur also in the eastern half of Cuba.

In the newly invaded region of the Cotton Belt the loss from boll-weevil damage may run as high as 50 per cent or more of the crop and invariably creates a condition bordering on panic among cotton planters. Under such conditions diversified farming and animal husbandry receive a powerful impetus. As time passes, however, and the planters learn the proper methods of raising cotton under boll-weevil con-

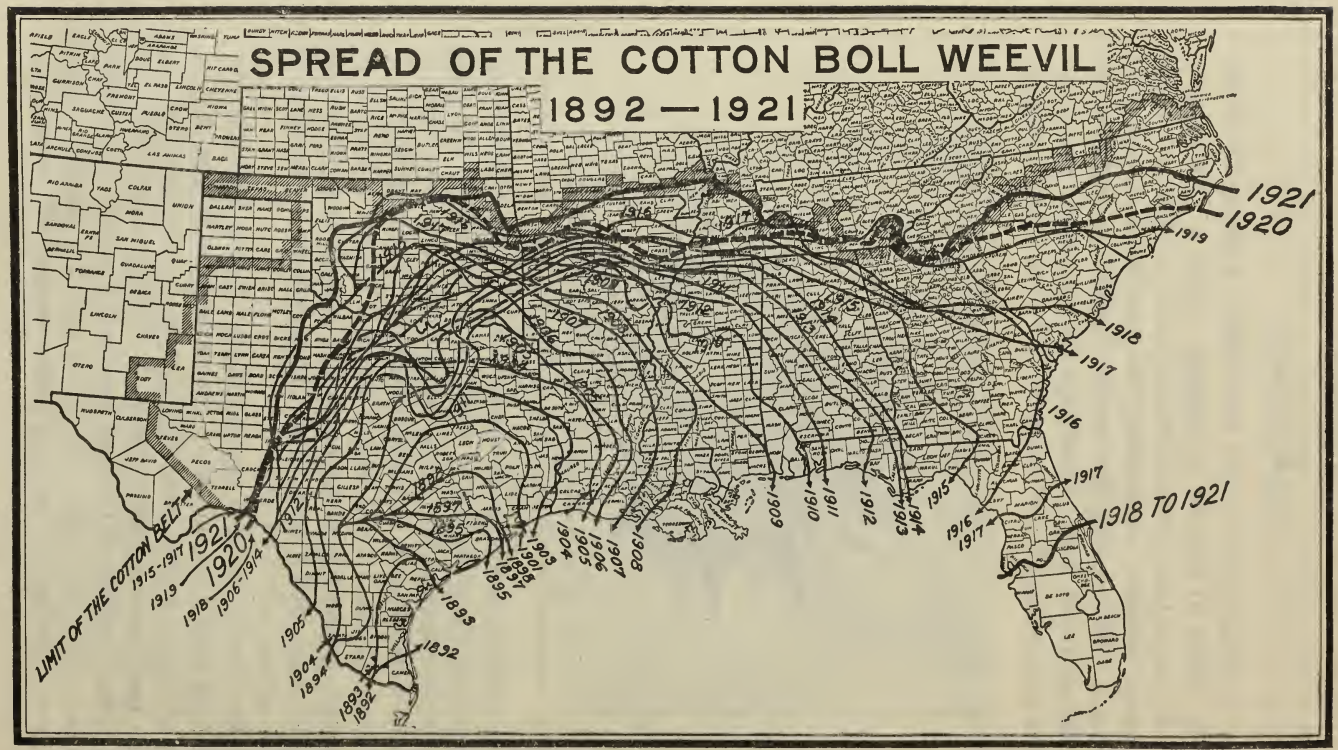


FIG. 23.—In 1892 the boll weevil crossed the Rio Grande from Mexico and occupied an insignificant area in the extreme southern tip of Texas. Note this area, indicated by the short line and the figures 1892. The map shows the subsequent spread of the weevil year by year.

ditions, a considerable reduction of the loss incident to the presence of the weevil is apparent.

The actual damage done by the boll weevil varies greatly from year to year. A very mild winter is invariably followed by a heavy weevil infestation during the following summer. Excessive rainfall during the summer months is also conducive to greater weevil activity. In prairie regions where the insect obtains little or no protection through the winter, it never becomes so numerous as in other quarters where conditions favorable for hibernation are found. The Bureau of Crop Estimates of this department in the fall of 1920 estimated the average annual loss for the last four years to be about $300,000,000.

Hibernation takes place in the adult stage. After frost in the fall the last surviving generation of adults seek such shelter as may be found under old cotton stalks and dead grass, or in near-by woods. In regions where Spanish moss is abundant, this material provides a favorite place for the weevil to pass the winter. An average of about 6 per cent of the weevils entering hibernation in the fall survive the winter. A very cold winter will reduce the number that will survive, and a very mild winter will augment it. In the spring the survivors emerge from hibernation, breed, and thus start another generation. Several generations are produced each year, each much more numerous than the last preceding. The period from generation to generation is about 25 days.

The boll weevil can not be eradicated, but certain measures may be taken which, under ordinary circumstances, will control it to the extent that a profitable crop of cotton may be raised.

During comparatively recent years a system of boll-weevil control by the use of calcium arsenate in dry-dust form has been developed. It has been thoroughly tested for the last seven years and has proved to be fairly successful. Specialized treatment of the plants with this arsenical is necessary for successful control. Publications giving details of this treatment are issued by the Bureau of Entomology.

In addition to the use of poison, certain other measures may be taken to reduce weevil damage. Fall destruction of the

cotton plants, either by burning or by plowing under, destroys the possible hibernating places of the weevil in the fields. If it can be done before the first killing frost great numbers of weevils will be destroyed.

The use of an early maturing variety of cotton is important. Likewise the seed should be planted as early in the spring as possible without risk of damage from frost. The object of this is to get the crop well along before the weevils have become numerous enough to be destructive.

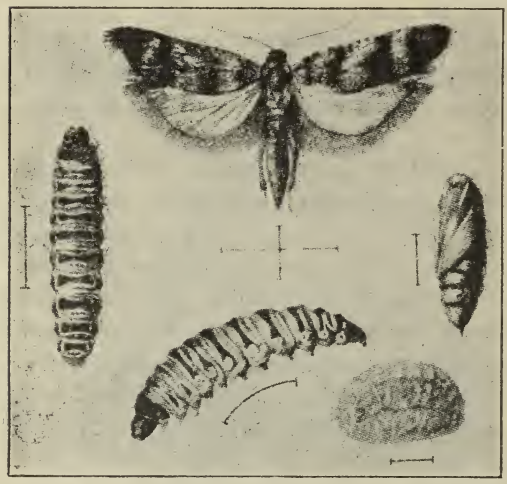


FIG. 24.—Pink bollworm. Adult, larva, pupa, and egg. (Enlarged.)

The Pink Bollworm

The pink bollworm has been known in other countries as a destructive cotton pest since the year 1842, at which time an English entomologist called attention to its depredations in India. It was first noted in Egypt in 1911. In the same year the pest was introduced into Mexico, evidently in two importations of cotton seed from Egypt. The fact of its establishment in Mexico did not become known to our authorities until 1916. An embargo upon Mexican cotton seed was declared immediately, but prior to this order large quantities of seed were shipped to certain oil mills in Texas for grinding. On September 10, 1917, the first infestation on American soil was found in a cotton field at Hearne, Tex.

The Hearne district was then made a cotton-free zone—that is, no cotton was grown in the district—and was so maintained for three years. This district is now believed to be entirely free from the pest, demonstrating what may be accomplished where adequate control is maintained for a

period of years. Other areas that have been found infested are indicated on the map (Fig. 25).

The damage which might result from the uncontrolled infestation of the Cotton Belt of the United States by the pink bollworm can be estimated only by the damage done elsewhere, as so far none of the outbreaks in this country have been allowed to go entirely uncontrolled. In November, 1920, a commission organized by the Texas Chamber of Commerce, after a careful investigation in the Laguna district of Mexico, where the insect has been allowed to run its natural course, submitted a report indicating a loss of at

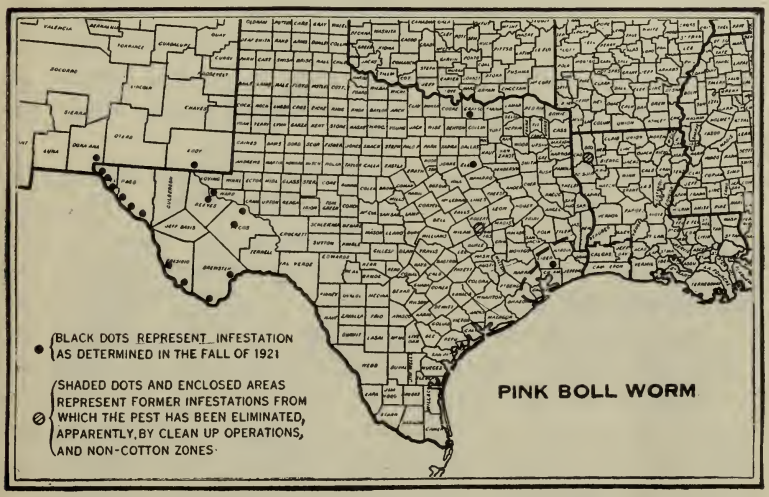


FIG. 25.—The pink bollworm was discovered in certain very limited areas in Texas in 1917 and in Louisiana during the winter of 1919–20. The pest has apparently been stamped out in Louisiana, and the actual infestation in Texas is greatly reduced.

least 50 per cent of the cotton crop of 1920 of that district due to the pink bollworm. As a matter of fact the pink bollworm is probably the most serious single cotton pest of the world. Its potential danger is greatly enhanced by the habit of the insect in the larval stage of entering the cotton seed and remaining there for several months of the year. By reason of this habit the pest is easily transported to any part of the globe where cotton seed is carried.

The only chance of exterminating this pest is by the enforcement for a period of years of noncotton zones for the

invaded areas, and any attempt at control which permits the continuation of the growth of cotton in such areas will be followed by the inevitable increase of the pest and its ultimate spread throughout the South. Perhaps the most determined fight which any nation has ever waged for the eradication of a single insect species within its borders has been carried on since the discovery of the pink bollworm in Texas, and the end is not yet.

The Cotton Bollworm.

Some doubt exists whether the cotton bollworm is a native species or came originally from some other country. At any rate, long before the advent of the boll weevil, it was one of the oldest, most widely distributed, and most destructive of injurious insects. It is a general feeder, attacking a great many wild and cultivated plants other than cotton.

A number of years ago the annual loss to the cotton crop caused by this pest was estimated at $8,500,000. The damage, however, is somewhat sporadic, being worse in some years than in others, and is likely to be very uneven over the Cotton Belt in any one year.

The insect passes the winter in the soil in one of the immature stages. Fall or winter plowing is therefore advantageous in its control. In fact the same methods of control advocated for the boll weevil are applicable to this species. If calcium arsenate is used for the weevil, this should be sufficient for the control of the bollworm.

The Cotton Leafworm.

The cotton leafworm has been known to cotton planters in the United States since 1793. It is unique in that it does not spend the winter in this country. It is a native of tropical regions south of the United States, and in some years does not appear here in destructive numbers. At other times the adult moths fly northward, reaching our Cotton Belt fairly early in the season, and there lay eggs for another generation. This soon appears as the familiar defoliating worm. At the end of the season, when cold weather sets in, all stages of the insect within our borders succumb to climatic conditions.

The species is easily controlled by the application of calcium arsenate as for the boll weevil.

Cotton Diseases in the United States.

Several important diseases attack the cotton crop and cause losses which in 1920 were estimated by the Plant Disease Survey of the United States Department of Agriculture at over 13 per cent of the total production.

Cotton Wilt.

Cotton wilt is a disease which causes stunting, wilting, and death of the entire plant. It is due to a fungus, Fusarium,

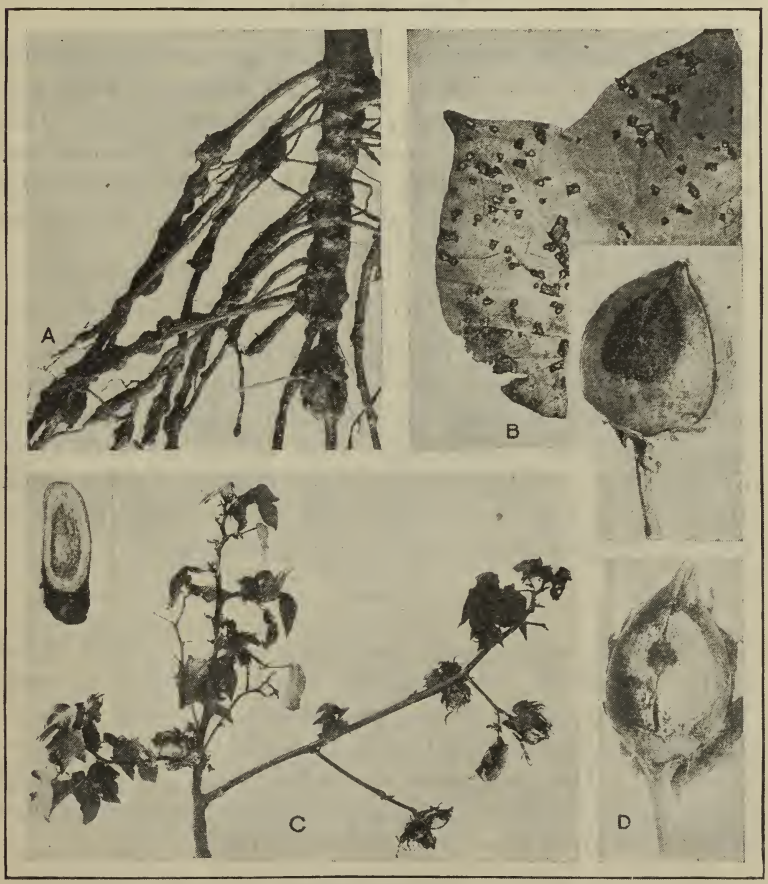


FIG. 26.—Four important diseases of cotton. A, An eelworm bores into cotton roots and causes rootknot. B, The angular leaf spot produces dead areas on the leaves and rotting of the bolls. C, The wilt disease stunts the plants and causes blackening of the inside of the stalks. D, This boll rot is due to anthracnose.

which enters the roots and plugs the water vessels. This parasite remains indefinitely in the soil, so that infested fields cannot be planted to the ordinary kinds of cotton. Resistant varieties bred by the Department of Agriculture have come into general use, however, and constitute an effective remedy for wilt. This trouble is widely distributed in the sandy soils of the coastal plain, from southern Virginia and North Carolina to Arkansas and eastern Texas, and is occasionally met in the Piedmont and other districts. (See Fig. 26.)

Texas Root-Rot.

Texas root-rot is due to another serious soil-infesting fungus, which occurs from Texas and Arkansas westward, principally on the black waxy or heavier types of soils. This causes a wilting of cotton over large areas in midsummer and constitutes a serious problem, as alfalfa, sweet potatoes, many fruits, and other crops are also susceptible, and because no thoroughly effective remedy is known.

Root-Knot.

Root-knot, a disease characterized by abnormal galls or swellings of the roots, is due to a tiny eelworm or nematode. The plants are dwarfed and the yield reduced. Root-knot occurs commonly in association with wilt on the same types of sandy soil. It attacks a very large number of other crops. Its control is based on rotation with immune crops or varieties, involving a readjustment of crop rotation.

Rust.

Rust is a name commonly used for a trouble marked by the early defoliation and premature death of cotton on soils lacking in vegetable matter and potash or poorly drained. It occurs throughout the Cotton Belt and causes large losses annually. The trouble is controllable by good farming methods, particularly by the use of potash fertilizers, stable manure, or green manuring, and by drainage.

Anthracnose

Anthracnose is a fungous disease of the cotton plant spread through the use of infected seed. It may cause a damping-off of the young seedlings and some injury to the plant, but

is most harmful as a cause of boll rot in wet weather. Anthracnose occurs to a greater or less extent over the entire Cotton Belt. It may be controlled by crop rotation and the use of disease-free seed.

Angular Leaf-Spot.

Angular leaf-spot, or bacterial blight, can be found in nearly every cotton field throughout the Cotton Belt as a leaf-spot, stem blight, and boll rot; but Upland cotton is quite resistant to it, and the losses are therefore not as great as in Egyptian cotton, which is very susceptible. The most effective method of control combines the use of disease-free seed with crop rotation.

All of these diseases are described more fully in Farmers' Bulletin 1187.

Cost of Production.

The problem of making ends meet has been especially serious for cotton growers in 1920 and 1921. Expenses have been high and prices low. Relief has been sought in efforts to enhance the prices to producers by various methods without marked success. Since the prices for each crop are determined after production and without regard to costs, farmers must attempt to forecast prices and to adjust operations so as to produce at a cost which will return a profit at the price for which the cotton will sell. Some farmers may not find it possible to reduce their costs low enough to meet prospective low prices for cotton, but may be able to produce something else with profit. In any case a knowledge of costs may be helpful to a farmer in determining how much cotton he should try to produce and how much he may profitably expend in producing it.

A grower who knows his own actual cost of production, and has average or standard figures to compare with his own, is in a fair way to stop small leaks in his expenses and to reinforce those features of his practice in which he has an advantage.

To assist cotton growers in establishing reasonable averages and working standards and to assemble cost information, which individuals acquire only slowly, the Office of Farm Management and Farm Economics undertook compre-

hensive studies of the cost of producing cotton. (See Fig. 27.) The first of these was made for the crop of 1918, in 10 representative counties in 4 States, the actual cost of producing cotton in 1918 being worked out for 842 farms. (See Bulletin 896, U. S. Dept. of Agriculture.) A similar study was made for the crop grown in 1919, the results of which are summarized in the charts on pages following.

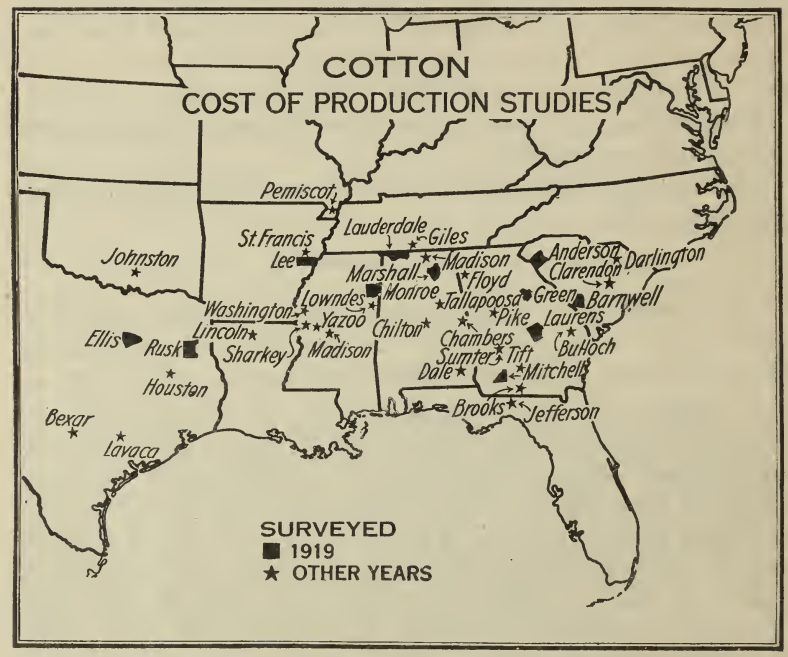


FIG. 27.—Location of surveys and cost of production studies in the Cotton Belt. The first of these was made for the crop of 1918 in 10 representative counties in 4 States. The results of the surveys made in 1919 are summarized in charts that follow.

Variation in Cost of Production.

A farmer who is keeping his own records and comparing with others must recognize the fact that costs necessarily vary from farm to farm, as well as from one region to another. This is due to variations in the character of producers themselves, as well as in the character of the land and of the methods employed in growing the crop. The variation in the net cost of lint cotton per pound on 783 farms in 1919 (Fig. 28), illustrates the wide range of costs.

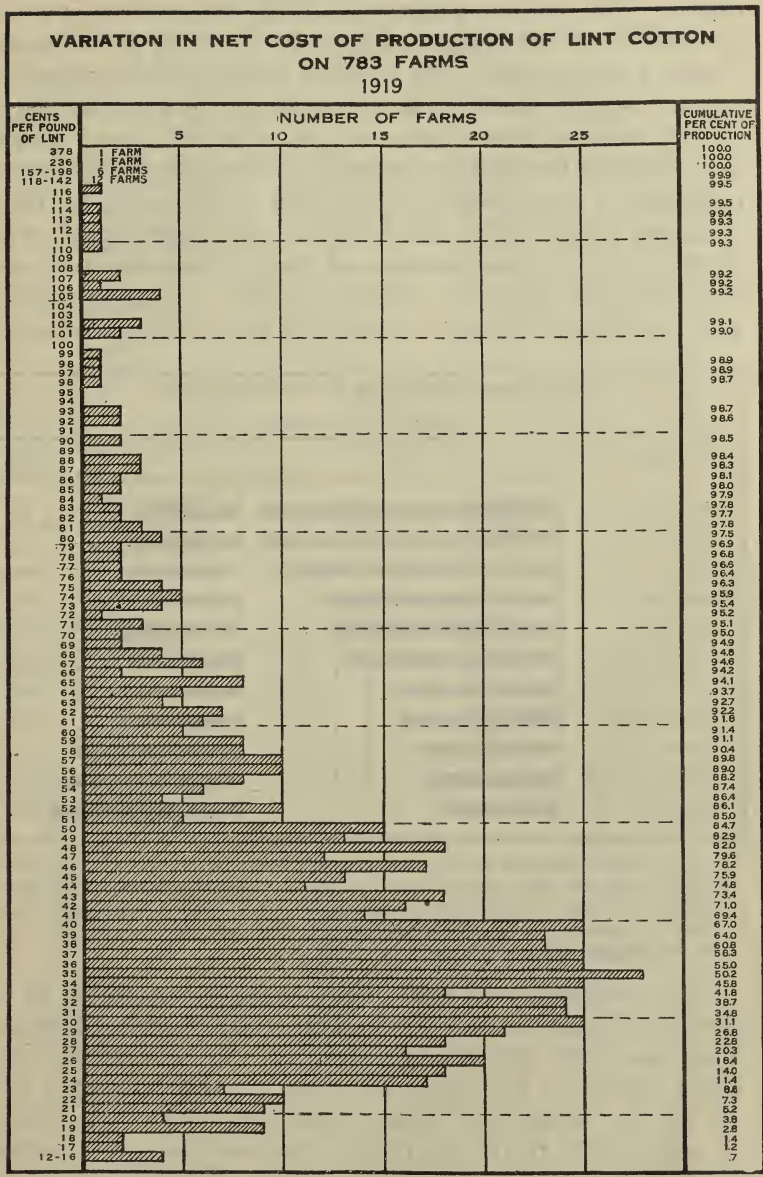


FIG. 28.—The net cost ranged from 12 cents to $3.78 per pound of lint. One-half of the cotton cost 35 cents and less. The bulk of the cotton, 85 per cent, was produced at a cost up to 50 cents per pound.

It costs more to produce cotton in some regions than in others. The net cost per acre and the net cost per pound of lint in 1919 are shown in Figure 29 for each of 11 typical Cotton Belt counties. The average yields per acre reported in each case are shown in a column to the right of the chart. It will be noted that high cost per acre with good yields may result in low cost per pound, and low cost per acre with ordinary or poor yields in high cost per pound. In fact, judicious expenditures for fertilizer, good seed, good care of the crop, or a combination of them, pays. In any year much depends upon the seasonal weather. The 1919 crop was practically a failure in three of the counties surveyed.

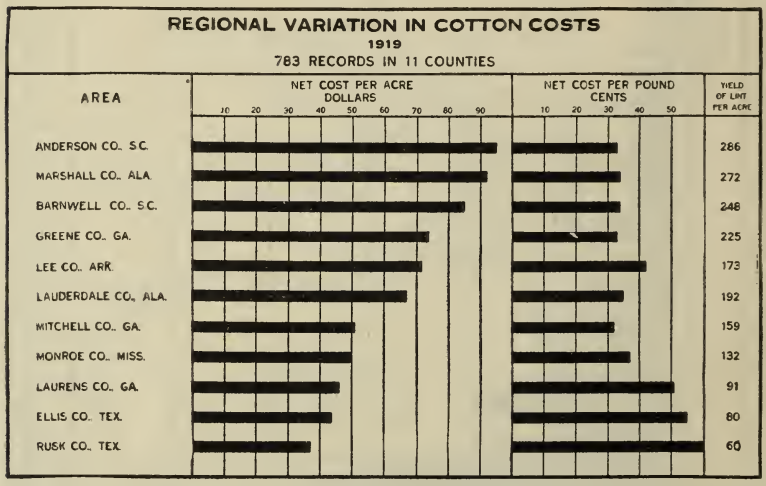


FIG. 29.—Variations both in the cost per acre and in the yield per acre cause variations in the net cost per pound of lint. The average acre in Anderson County cultivated at the highest cost in 1919 produced the highest average yield at the lowest cost per pound. It is not always the greater the cost the higher the yield. Note Lee County, Ark.

The distribution of costs differs with the practice, as is shown in Figure 30 for several of the more important factors. Thus labor per acre is relatively low in Ellis County, Tex., where the fields are large and level enough to permit the use of two horses and riding cultivators instead of a man to each mule. In the South Carolina and Georgia counties the use of fertilizer was very general and liberal, while in Ellis County, Tex., no fertilizer was used on cotton, and only one of the farms in Lee County, Ark., reported use of fertilizer. The value of the land, use cost, or rent of land is

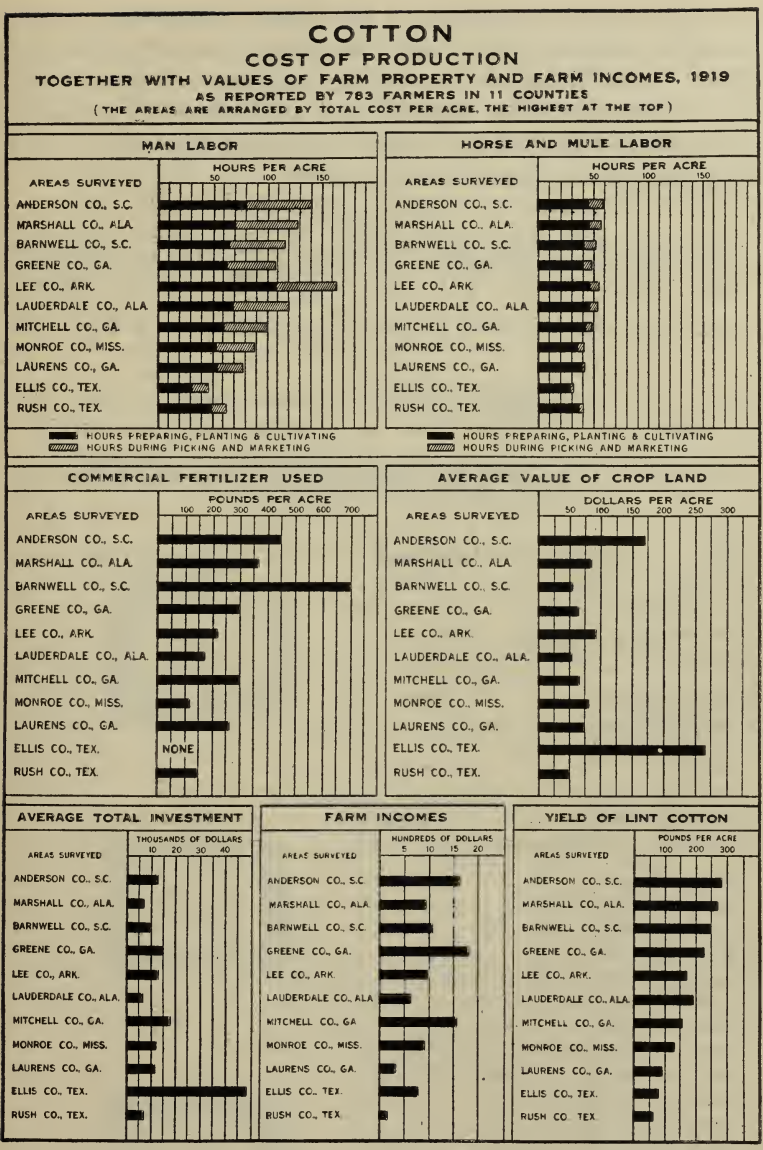


FIG. 30.—Counties are arranged in the order of the total cost per acre, the highest at the top. Note especially the contrast between Anderson County, S. C., and Ellis County, Tex. Cost per acre and yield per acre in Anderson County stands first among all the counties, is second in value of fertilizers used, in value of crop land, and in farm income; whereas Ellis County had next to the lowest yields produced with the smallest amount of labor, no fertilizer, and gave an average farm income on crop land averaging the highest in value of any of the counties.

another widely variable item, the lowest values being found in Rush County, Tex., and the highest in Ellis County, Tex. In addition to the average expense of labor, horse labor, fertilizer, and value of land, the chart shows also the value of the total farm capital, the farm income for 1919, and the yield of lint cotton per acre.

An Example.

As a guide for the use of farmers who wish to determine their actual costs for any season promptly and very closely,

Example for figuring costs per acre of cotton and per pound of lint.

Items.	Figures for Mitchell County, Ga., crop of 1919.			Your farm.					
				1921			1922		
	Amount.	Price.	Cost.	Amount.	Price.	Cost.	Amount.	Price.	Cost.
Labor:									
Man	100 hours	$0.30	$30.00						
Mule	48 do	.25	12.00						
Seed (bushel=30 pounds)	1 bushel	1.35	1.35						
Fertilizer	292 pounds	[1].021	6.13						
Total of foregoing items (84.4 per cent of operating cost)[2]			49.48						
Total operating cost (100 per cent)			58.63						
Credit seed	300 pounds	[3].04	12.00						
Net operating cost per acre			46.63						
Net operating cost per pound ($46.63 = 159 pounds)			.29						
Rent of land or interest on investment, per acre	$67.00	6%	4.02						
Total net cost per acre (including rent)			50.65						
Total net cost per pound (including rent)			.32						

[1] Price, $42 per ton.
[2] Operating costs represent all costs except interest on land. The remaining 15.6 per cent of operating costs is made up of manure, equipment, taxes, insurance, ginning, and overhead.
[3] $80 per ton.

an example is worked out, using the figures for Mitchell County, Ga., and space is provided for setting down the figures for any individual farm. It is best to use the actual figures, if possible, but even in case no attention has been paid to the time and materials used one can not go very far astray if careful estimates are made by means of comparisons with average or standard figures. In each case the yield of cotton should be estimated as closely as possible, because errors in the yield will make considerable differences in the computations of cost per pound.

Costs and Prices.

Though producers are more or less at the mercy of consumers with respect to price, they can exercise considerable

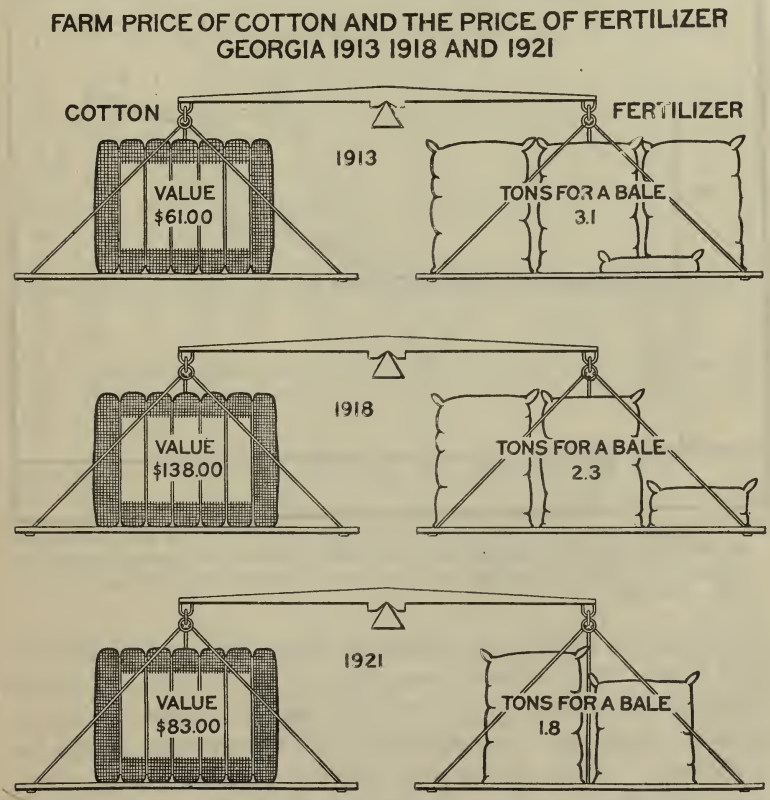


FIG. 31.—The cost of fertilizers is a very important item in the cost of production in the South Atlantic States. The data represented here for 1913, 1918, are taken from surveys of Sumter County, Ga. For 1921 prices represent Georgia.

control over the cost of their product. When prices were going up and the prospects for higher prices were still good costs were voluntarily increased, because it was good judgment to pay higher prices for labor, fertilizer, land, and machinery, if it were necessary in order to produce the cotton. The average cost of the 1918 crop was approximately 22 cents a pound, while the average farm price was

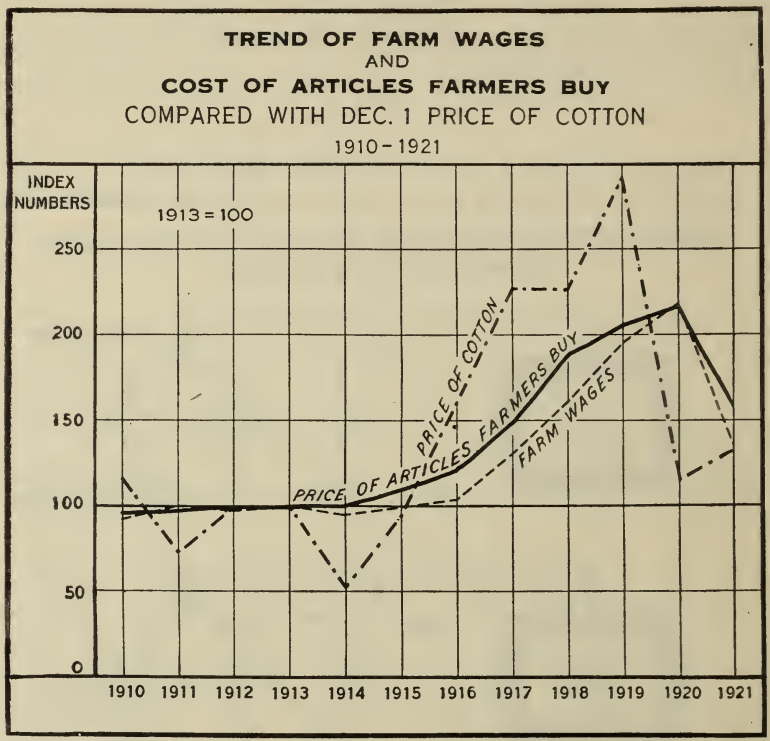


FIG. 32.—The price of cotton fell to a low point in 1914, rose to high points 1916–1919, and fell to a low point in 1920. Wages and prices of articles farmers buy rose less rapidly in the period of inflation and fell more slowly with deflation.

28.76 cents a pound, or enough to cover the cost of 85 per cent of the crop. Prices were still rising in 1919 and costs averaged 35 cents a pound, which was just about the farm price of 35.36 cents a pound, and half the growers failed to make costs. When the crop of 1920 was planted cotton prices were still high and no particular effort was made to cut expenses. While the crop was growing the price was falling, with the result that the crop produced at a high

cost had to be sold at a low price. Some retrenchment was made in 1921, as evidenced by the lower wages paid and the lower prices for materials, but not enough to offset the combined effect of a good crop, a large hold over, and a stagnant market. The relative changes in the cost of production for the years 1910 to 1921 are indicated in Figure 32, farm wages and the prices of things farmers buy being used as an index of the movement of the cost of producing cotton.

Organization for Profitable Production.

The cost of producing farm products, the farm income, and the welfare of the farm family and the community are strongly influenced by the enterprises selected and their relative magnitudes in the organization of the farm.

It has been found that those cotton farmers who in planning their cropping systems provide first for sufficient acreages of corn, small grains, hay, and other feed crops (including among these cowpeas, peanuts, velvet beans, and similar crops planted by themselves and interplanted among rows of other crops), not only to feed pigs, chickens, the farm work stock, and the family cows, but also to build up and maintain soil fertility, are able to produce cotton at low cost, and they get the best returns for land used and capital and labor expended. These farmers usually plan for as many acres of cotton as they can care for properly and harvest early with the available farm equipment and such outside assistance as may be relied upon.

Proper care of the crop involves thorough preparatory tillage, proper application of fertilizers and manures, thorough cultivation, and thorough and persistent combative measures against the boll weevil and other destructive insects.

After providing for farm needs, including fertility, and for such acreages of cotton as can be well cared for, other enterprises may be selected in order to make use of unutilized land and labor. Such enterprises may increase food and feed for sale or for some productive live stock enterprise, but care must be taken that these added enterprises do not seriously compete with cotton in its labor requirements or tend to diminish the fertility of the soil.

The choice of crops and groupings will vary according to conditions. For example, in Figure 33 are given the average

relative sizes of the crop enterprises on some of the more profitable 1-mule to 6-mule farms in communities in Sumter and Brooks Counties, Ga., in 1913 and 1914. A marked difference will be noted in the organization of the two communities. In the Sumter County community, after making fair provision for the farm needs, the remainder of the land was devoted largely to cotton, the most important commercial enterprise. In the Brooks County community the soil was thinner and it was necessary to pay particular attention to the maintenance of soil fertility, so a system was developed which gave a smaller acreage to cotton and paid particular attention to corn, legumes, feed crops, and hogs. Besides the

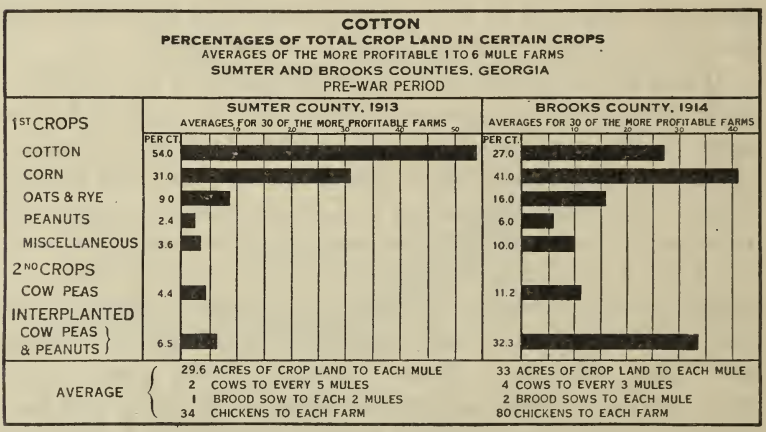


FIG. 33.—In Sumter County there is much greater specialization in cotton than in Brooks County. In the latter more attention is being given to the growing of crops that will maintain or improve soil fertility, consequently more live stock are kept and more leguminous crops are grown.

regular peanut crop, peanuts were planted between the corn rows on about one-third of the corn area. The Sumter County farms carried 2 cows to each 5 mules, while the Brooks County farms carried 4 cows to each 3 mules. The Sumter County farms carried 1 brood sow to each 2 mules, while the Brooks County farms carried 2 brood sows to each mule. Among the important miscellaneous crops on these farms were watermelons, sweet and Irish potatoes, sugar cane, and garden vegetables.

It is not intimated that these systems of cropping were the best that these farmers could have devised for their farms or for the communities represented, but they were evidently

better than the average in that they yielded comparatively high returns for the use of land, working capital, and labor.

Systems of cropping change as conditions change. Figure 34 gives the organization of crop enterprises on the more profitable 1-mule to 6-mule farms in Sumter County five years later, in 1918. The main difference between the 1918 and 1913 systems was a reduction in the percentage of land devoted to cotton in 1918 to better meet boll-weevil invasion and the high cost of fertilizers. The actual and relative number of cows and brood sows was increased. The 30 more profitable Sumter County farms in 1913 spent $1,057 for feed, while the 1918 group spent only $298 for this purpose. The 1918 system shows a larger planting of legume feed crops to reduce the cost of maintaining the live stock, to utilize land and labor not required by cotton, and also to maintain fertility better.

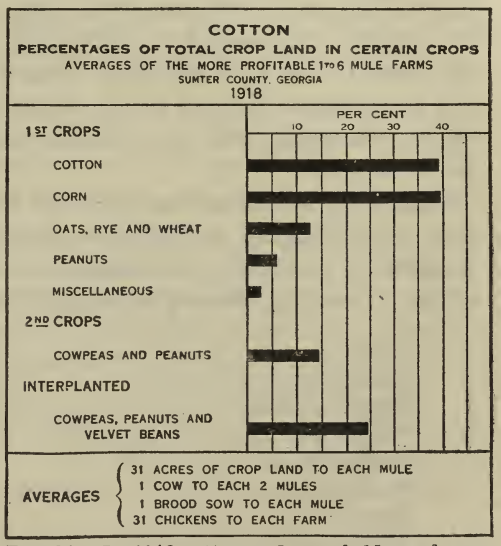


FIG. 34.—In 1918 cotton and corn held equal areas in Sumter County. Cowpeas, peanuts, and velvet beans were planted extensively after the other crops or interplanted with them.

Financing the Cotton Grower.

The production of cotton in the United States rests upon credit to a rather unusual extent compared with most other agricultural products. The chief agencies from which this credit is obtained by the cotton farmer are the bank, the merchant, and in the case of tenants the landowner. In this credit extension the merchant, of course, is essentially an intermediary between the banker and the farmer, while in the case of the tenant the landowner, by guaranteeing the repayment of the credit advanced, also acts as an intermediary, either between the bank and the tenant or the merchant and the tenant.

Merchant credit as a rule is a particularly expensive and unsatisfactory form of credit, whether extended by the storekeeper, the implement dealer, or the cotton factor. The difference between cash prices and time prices usually far exceeds the cost of bank credit needed for the purchase of corresponding amounts of goods. The substitution of direct bank credit for merchant credit is therefore to be recommended wherever possible. The consolidation of numerous small loans into fewer and larger ones by means of credit associations would result in further economy. It is also to be hoped that the cotton farmer will, to an increasing extent, acquire and maintain his own operating capital and thus reduce the need for production credit and strengthen the security for such credit as is needed. Only in this way can be brought about a credit situation in which an ample supply of capital will be available on terms favorable to the borrower.

According to a study made by the Department of Agriculture in the spring of 1921, the average prevailing rate of interest on personal and collateral loans to farmers for each of the 10 leading cotton-producing States was as follows:

	Per cent
North Carolina	6.23
Tennessee	7.88
South Carolina	8.06
Mississippi	8.11
Louisiana	8.34
Alabama	8.46
Georgia	8.94
Texas	9.68
Oklahoma	9.84
Arkansas	9.70

In all of these States the actual average interest cost, however, was considerably higher than shown by the above figures, because of the prevalent practice among the banks in these States of collecting interest in advance, and of a common but less frequent practice of requiring borrowers to maintain a minimum deposit at the bank while the loan is outstanding.

Because of the relatively high percentage of tenancy in the cotton-producing States, the question of security for loans is especially significant. The following table shows the prevailing forms of security for personal and collateral loans to farmers in the so-called Cotton States.

Form of security given for personal and collateral bank loans to farmers in 10 leading Cotton States; per cent of loans secured by various forms of security.

State.	Note without indorsement.	Note with one or more indorsements.	Mortgage on live stock.	Crop lien.	Warehouse receipt.	Stocks and bonds.	Other ways.
North Carolina	10.5	68.6	1.7	5.2	2.1	7.5	4.4
South Carolina	9.1	41.0	13.6	20.2	9.7	4.8	1.6
Georgia	12.5	50.1	14.5	4.9	10.0	3.5	4.5
Tennessee	18.1	67.2	5.0	1.5	.8	5.8	1.6
Alabama	10.4	20.1	31.5	26.1	7.5	2.4	2.0
Mississippi	12.7	27.0	20.2	15.1	8.0	9.1	7.9
Arkansas	12.1	37.9	22.7	19.9	3.0	2.2	2.2
Louisiana	15.5	52.7	12.4	5.2	2.7	9.0	2.5
Oklahoma	17.2	12.9	49.3	18.1	.7	1.2	.6
Texas	21.9	18.0	38.1	18.3	1.6	1.1	.0

Personal notes with one or more indorsements are the prevailing form of security in a large majority of these States. Mortgages on live stock and crop liens come next in importance. Warehouse receipts are as yet seldom used by the farmer, but will no doubt increase in popularity as adequate warehouse systems are established.

One of the most common complaints heard with reference to bank loans to farmers from these States, as well as from those in other sections of the country, is that the term is frequently too short to meet the farmer's credit needs. The prevailing term of such loans may be seen from the following table, based on the study to which reference has already been made:

Average term of personal and collateral loans to farmers: Per cent of banks reporting various average terms, March, 1921.

State.	One to thirty days.	One to three months.	Three to six months.	Six to nine months.	Nine to twelve months.	More than one year.
North Carolina	.....	28.0	53.7	15.9	2.4	.....
South Carolina	.....	12.5	40.1	40.8	6.6	.....
Georgia	.....	3.9	50.3	38.5	7.3	.....
Tennessee	.....	28.5	45.0	14.6	11.9	.....
Alabama	.....	4.2	30.5	39.9	25.4	.....
Mississippi	.....	9.2	31.2	38.5	19.3	1.8
Arkansas	.....	7.2	36.7	45.9	10.2	.....
Louisiana	.....	9.3	37.2	37.2	16.3	.....
Oklahoma	0.4	11.6	49.6	31.9	6.5	.....
Texas	.....	7.9	52.1	33.0	6.7	.3

Cotton Handling and Marketing.

The days of the American homespun are past, and now the entire American cotton crop is produced for the market. The course of the cotton from the producer to the mills depends on the point of origin, the location of the mills for which it is destined, the means of transportation, and the methods of trading. The price that the producer receives depends not only upon the supply and demand at the consuming points, but also upon the cost of handling from the producer to the mills, the middlemen's profits, and the ability of the producer to take advantage of the most economical methods of marketing his crop.

The process of separating the lint from the seed is known as ginning. This the producer usually has done before he sells, which enables him to dispose of both the seed and the fiber to the best advantage. The producer may sell his cotton at once or hold it until some future date. He may sell directly to a mill buyer or to some one of the numerous grades of dealers in cotton.

Southern cotton mills consume about one-fourth of the American crop, the bulk of which is produced locally in the South Atlantic States. The rest of the crop must be transported by rail or water either to northern mills or abroad. The movement of the great American cotton crop therefore necessitates an extensive system of transportation as well as of markets.

Short Staple and Long Staple Cottons.

The length and the character of the fiber or staple are the most important of the factors that determine the value of cotton. Cottons differing in length and character of fiber require special methods in handling and marketing. Commercially all cotton is divided into two classes—short staple, that of $1\frac{1}{16}$ inches and under in length, and long staple, cotton $1\frac{1}{8}$ inches and over in length of fibers. Cottons, however, having a staple length of $1\frac{1}{16}$ inches usually command a premium over short-staple cottons of $\frac{7}{8}$ to 1 inch in length of staple. The length and strength of fiber produced in any locality depend on the variety planted, the soil, climatic conditions, and cultural methods.

Short staple.—Short-staple cotton is grown in all parts of the Cotton Belt and constitutes the bulk of the American

crop, or an average of 92 per cent. The length of the fiber of this cotton varies from three-fourths to $1\frac{1}{16}$ inches. In parts of the Piedmont region and on the better types of soils the length is often more than an inch, while on the sandy and other poorer soils it may be less than seven-eighths of an inch. On the rich river bottoms and on the black prairie lands of Texas and Oklahoma the cotton grown is usually $1\frac{1}{16}$ inches in length and has a characteristic strong, hard staple.

Long staple.—Upland varieties with fiber $1\frac{1}{8}$ to $1\frac{3}{4}$ inches long are grown in many parts of the South, the production of some sections being recognized by characteristic differences in quality and strength of staple. The bulk of the long-staple upland cotton is produced in the Yazoo-Mississippi Delta, the north central section of South Carolina, and the bottom lands of Texas and Arkansas. (See table following:)

Comparison of production of long-staple cotton (1⅛ inches and above in length) with production of short-staple cotton (under 1⅛ inches in length) in the United States; estimates 1919 and 1920.

State.	Bales, thousands, i. e. 000 omitted.						Per cent.					
	Under 1⅛ inches.		1⅛ to 1¼ inches, inclusive.		Over 1¼ inches.[1]		Under 1⅛ inches.		1⅛ to 1¼ inches, inclusive.		Over 1¼ inches.[1]	
	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920
Alabama	711	662	2	1	.....	.....	99.7	99.9	0.3	0.1	.....	.....
Arkansas	718	947	136	225	30	37	81.2	78.3	15.4	18.6	3.4	3.1
Arizona	21	21	.....	.....	39	82	35.0	20.6	.....	.....	65.0	79.4
California	45	64	10	3	1	8	80.3	85.3	17.9	4.0	1.8	10.7
Florida	14	15	.....	2	2	1	87.5	82.8	.....	11.1	12.5	6.1
Georgia	1,639	1,384	18	27	3	4	98.7	97.8	1.1	1.9	.2	.3
Louisiana	290	375	7	10	1	2	97.3	96.9	2.4	2.6	.3	.5
Mississippi	619	612	300	252	42	29	64.4	68.5	31.2	28.2	4.4	3.2
Missouri	60	71	4	5	.....	1	94.4	92.3	5.6	6.4	.....	1.3
North Carolina	817	900	12	10	1	2	98.5	98.7	1.4	1.1	.1	.2
Oklahoma	937	1,125	77	192	2	4	92.2	85.2	7.6	14.5	.2	.3
South Carolina	1,309	1,437	93	144	24	29	91.8	89.3	6.5	8.9	1.7	1.8
Tennessee	293	312	15	11	2	1	94.5	96.2	4.9	3.5	.6	.3
Texas	2,916	4,091	177	230	6	5	94.1	94.6	5.7	5.3	.2	.1
All others	28	27	.....	.....	.....	.....	100.0	100.0	.....	.....	.....	.....
United States	10,417	12,049	851	1,112	153	205	91.2	90.2	7.5	8.3	1.3	1.5

[1] Including 91,965 running bales of American-Egyptian and 1,725 bales of Sea Island cotton for 1920, reduced to 500-pound bales.

Sea island.—Sea island is a distinct type of cotton, noted for its length of staple, 1½ to 2⅛ inches, and its strong, very fine, and silky fibers. The sea-island cotton produced on the islands off the coast of South Carolina has the longest and finest staple of any cotton. That grown on the coastal plain of Georgia and north Florida is somewhat shorter and coarser. At present the boll weevil has practically stopped the growing of sea-island cotton in the United States, the crop of 1920 amounting to less than 2,000 bales of 500 pounds each. Recently, however, a new upland variety called Meade has been developed in this section and is replacing the sea-island cotton. Meade cotton has a very fine strong staple 1⅝ to 1¾ inches in length, comparable with sea island.

American Egyptian.—The American-Egyptian cotton crop is produced chiefly in the valleys of the Salt, Gila, and Colorado Rivers of Arizona, and in the Palo Verde, Imperial, and San Joaquin Valleys of California. Practically the entire crop is of a single variety, known as Pima, which produces a staple of from 1½ to 1¾ inches in length.

Ginning.

Two types of machines are now in use for separating cotton fibers from the seed on which they grow. They are known as roller and saw gins. The roller gin is the older type. In the roller gin the fibers are caught between a leather-covered roll and a fixed steel bar or blade, while a movable bar knocks the seed loose. The roller gin is especially adapted for use in ginning varieties having slick or smooth seed and long fibers that are easily detached from the seed coat, such as sea island, American Egyptian, and Meade. The output of the roller gin is smaller per day than that of the other type, known as the saw gin. In the saw gin the fibers are caught in the teeth of circular saws and pulled through a slot between metal ribs. The slot is adjusted so as to permit the passage of the fibers but to prevent the passage of the seed, so that the cotton is stripped from the seed, which fall back and out of the way. The saw gin is especially adapted for the ginning of short staples with fuzzy seed and fibers that are tightly attached to the seed coat.

While the ginning of cotton is done primarily in order to bale the farmer's product so that it may be sold, it is the first

step in the preparation of the fiber for spinning, and therefore the condition in which the lint comes from the gin has a most important bearing on its future value and is the primary basis for grades on which purchases are made. Some of the factors influencing the grade of cotton as it comes from the gin are the care with which it has been harvested and prepared for ginning, i. e., whether ripe, clean, and dry; second, the condition of the ginning mechanism and the skill of operation, i. e., clean machinery in prime condition, operated both as to the feeding and speed with care, taking into consideration the type of the cotton being ginned and its physical condition.

FIG. 35.—Cotton gin in Texas. Each wagon holds enough seed cotton to make a bale of lint weighing about 500 pounds.

Baling.—As the lint or fiber (or raw cotton) comes from the gin it is put up in packages of different sizes and shapes. The bulk of the American crop, however, is packed into a press box 54 inches long and 27 inches wide and to a depth of about 45 inches. This makes the standard "flat" or "square" bale, which weighs about 500 pounds. It is covered on two sides and on the ends with bagging and is tied with six iron bands. In the western part of the Cotton Belt there are some gins which make bales cylindrical in shape but known as "round" bales. These are approximately 35 inches long and 22 inches in diameter, are completely covered with bagging, and weigh about 250 pounds. The sea-

island cotton produced in South Carolina is put up in bags 7½ feet long and 2½ feet in diameter and weigh approximately 350 pounds.

Compressing.—With the exception of the round bale and the recently devised gin-compressed bale, which is a small square bale and, like the round bale, built up under pressure automatically as the ginning is done, the American cotton bale is of comparatively low density and is not only unwieldy but does not fit into either freight cars or ship holds economically. In order that the maximum number of pounds of cotton may be packed for shipment, square bales are subjected to a recompression by which the cotton is compacted to a high density and the bale reduced to approximately one-half its original size. At the same time patches are added to cover all sample holes and to make up the usual tare allowance. Plants for recompressing the bales are usually located at interior markets and railroad concentration points and are known as "compresses."

The standard 500-pound square bale as it comes from the gin has a density of only 12 to 15 pounds per cubic foot, and from 30 to 35 of them fill a 36-foot box car. When they are compressed at the ordinary or standard compresses to a density of 22 to 24 pounds per cubic foot, from 65 to 75 bales may be loaded into a car. The "round" gin-compressed bale, weighing about 250 pounds, has a density of 32 to 37 pounds per cubic foot, and approximately 200 of them may be packed in a car, equivalent to 100 standard bales. The square gin-compressed bale has a density of about 35 pounds to the cubic foot.

At some of the concentration points and ports, such as Houston, Galveston, New Orleans, Mobile, Augusta, and Savannah, there are "high-density" compresses, which give the bale a density of 35 pounds or more per cubic foot, which results in a still greater saving of car and cargo space.

Custom ginning.—In the early days of the cotton industry the larger plantations owned and operated gins, but with the extension of the industry and the growth of the number of small farms came the establishment of public gins. The efficiency of the public gins has led to the abandonment of practically all of the old plantation gins. Even where plantation gins still operate they also, as a rule, do custom

ginning. Public ginneries are now established in practically every locality where the production of cotton is sufficient to support one. During the season of 1920–21 there were in actual operation 18,440 ginneries, which ginned on an average of 720 bales each.

The modern public gin is equipped with pneumatic elevators and distributors, by which the seed cotton brought in by the growers is sucked up from the wagons through pipes and, after passing through cleaning apparatus, is distributed to the different ginning machines or gin stands, as they are called. (See Fig. 35.) The lint, after it is taken from the seed by the saws, is again caught in a blast of air and conveyed through flues to the condenser and baling press. The seed fall into a trough, through which they are carried either by a screw conveyor or by an air blast to a seed chute or to bins in a seed house. If the grower desires the return of his seed he drives his wagon under the seed chute and receives them as they come from the gin. If, however, he sells the seed to the ginner or to some other agent of the cotton-oil mills, they are delivered to the bins in the seed house and from there transferred in car lots to the oil mills. Public ginners usually make a charge for ginning by the hundred pounds of seed cotton, and an extra charge for the bagging and ties applied to the bales. These charges or tolls vary in the different sections according to the costs involved. They are regulated also to some extent by agreement and by local laws.

Selling cotton in the seed.—In a few sections of the Cotton Belt some farmers sell their cotton before it is ginned, or "in the seed," as it is known. The practice of selling cotton in the seed is most prevalent in those sections where the cotton-growing industry has only recently developed or where cotton is not very extensively grown. The ginners buy the cotton seed as it is brought in and gin it whenever enough has accumulated for a run. In settling with the producer the average outturn or lint percentage of the community is usually taken as a basis. The ratio of seed to lint is approximately 2 to 1, though some of the improved varieties turn out from 35 to 40 per cent of lint. The application of averages therefore often results in not giving the individual farmer the price he deserves. From every angle the practice

of selling cotton in the seed is most unfortunate, since the producer has no incentive for growing better varieties or for making any effort to improve his grade and is prevented from maintaining the purity of his seed supply.

Handling Cotton Seed.

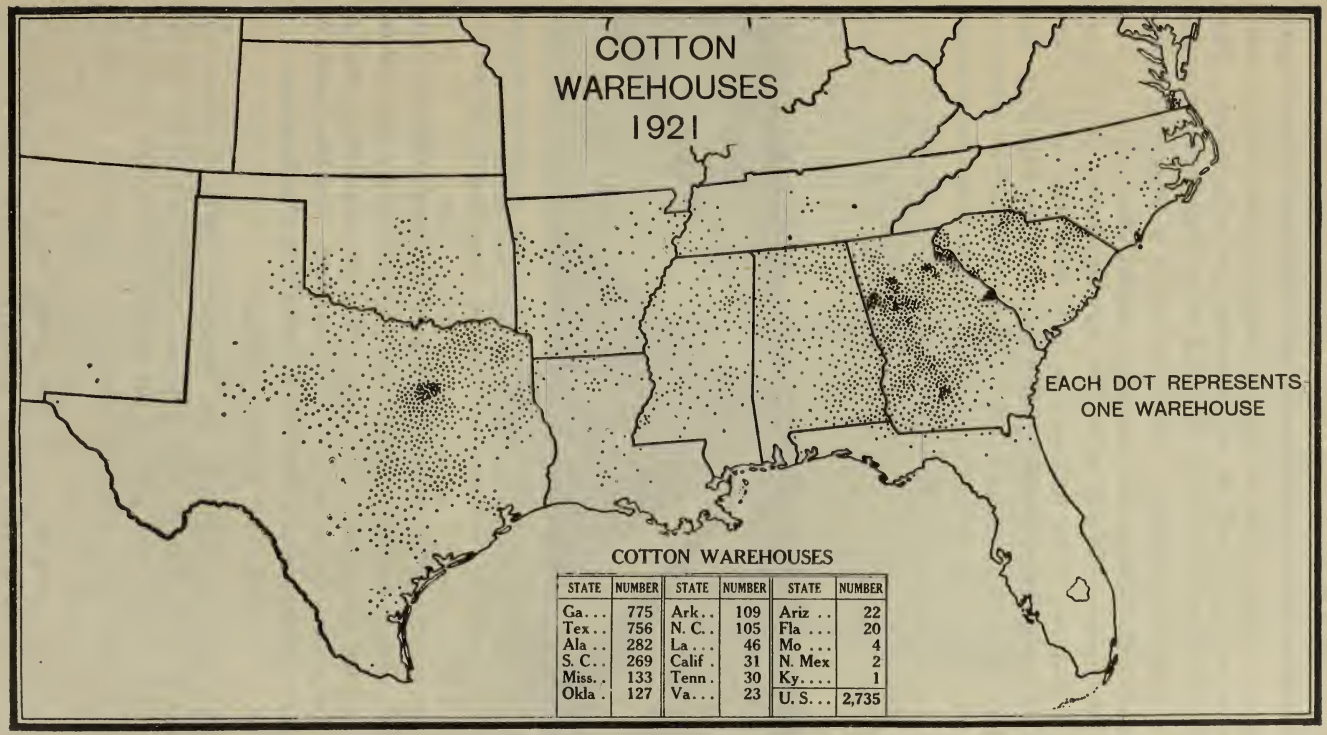
As indicated above, about two-thirds of the weight of the cotton, as it is picked and hauled to the gin, is seed. With the exception of such seed as is required for planting, practically all cotton seed now reaches the oil mills, where it is crushed and the oil extracted. The seed is now a valuable part of the cotton crop and is becoming still more valuable as the demand for its products increases.

Oil mills.—Cotton seed being bulky, the cost of transportation makes long-distance shipments unprofitable; consequently oil mills have been located in the producing region, generally at points at which the seed can be collected conveniently from the ginneries. In 1920 there were 675 seed-crushing oil mills well distributed throughout the Cotton Belt. The four primary products from crushing cotton seed are linters, hulls, cake, and oil. The process of crushing, briefly described, is as follows:

The seed first are cleaned of dirt and trash, then passed through a delinting machine, which removes the short lint or fuzz, making what are known as "linters"; it is then passed through machines which crush or cut the seed in fine pieces and separate the hulls from the kernels; and finally the oil is expressed from the kernels in hydraulic presses, leaving a residue which is called "cake" and which when ground becomes cottonseed meal. In the "cold-press" mills the whole seed is crushed and no effort is made to separate hulls from kernels.

Warehousing.

The warehousing of cotton after ginning is very important economically. Leaving the baled cotton exposed to the weather results in large losses annually from the rotting of the fiber. Such damage is commonly known as "country damage." The cotton warehouse is a place of shelter and protection from fire and theft; a place for classing and assorting to meet mill requirements; and finally it is a place



COTTON WAREHOUSES

STATE	NUMBER	STATE	NUMBER	STATE	NUMBER
Ga...	775	Ark..	109	Ariz ..	22
Tex..	756	N. C..	105	Fla ...	20
Ala ..	282	La...	46	Mo ...	4
S. C..	269	Calif .	31	N. Mex	2
Miss..	133	Tenn .	30	Ky....	1
Okla .	127	Va...	23	U. S...	2,735

FIG. 36.—There are warehouses at many local markets, as well as at the larger concentration points throughout the South. Where cotton is customarily marketed as soon as it is ginned there are comparatively few warehouses, except at concentration points.

where cotton may be deposited under conditions which enable the owner to obtain money advance upon it until such time as he may desire to sell. Receipts of responsible warehouses are considered among the best kinds of security. The Federal warehouse act of August, 1916, facilitates the use of warehouse receipts by holders of cotton in financing themselves while holding for favorable market conditions.

Warehouses.—Warehouses for storing cotton have been built at many local markets, as well as at the larger concentration points throughout the South. (See Fig. 36.) In Arkansas, Oklahoma, and Texas, where much of the cotton is customarily marketed as soon as it is ginned, and is shipped

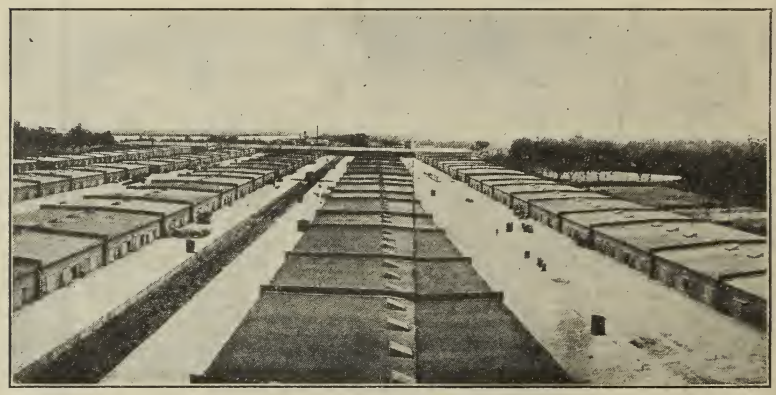


FIG. 37.—A modern concentration and export warehouse of semislow-burning construction. The wide courts are for receiving from cars and for delivery to the compress in the background. The hose houses are located between the buildings.

directly to the mills or exported, there are comparatively few warehouses, except at concentration points where the cotton is held by merchants. The same statement applies generally to Tennessee, Mississippi, and Louisiana. In the Eastern States warehouses are usually accessible to the farmers.

Grading Cotton.

The value of cotton to the consuming mills is measured not only by the length, strength, and uniformity of the staple but also by its color and by the amount of foreign material that it contains. While in the wild state species of cotton are found with fibers of a variety of colors, the principal varieties of commerce, with the exception of a few, such as the brown Egyptians, are of a creamy or pure white color.

Seasonal conditions, such as frosts or excessively damp or rainy weather, stain and discolor cotton. In some sections cotton unduly exposed to the weather after maturing receives a bluish cast or becomes mildewed. This condition so frequently occurs in some sections as to lead to the belief that the damage is connected with certain types of soil. The fibers of "blue cotton" are usually weakened. Dirt, sand, broken leaves, and stems become lodged in cotton fibers during storms and long exposure in the field, and when picked and ginned with the cotton reduce its value in proportion to the quantity of such foreign matter present.

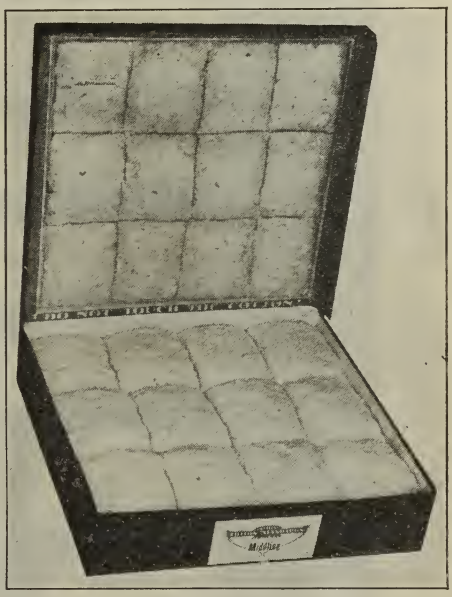


FIG. 38.—Grading by standards. A full set of white standards consists of 9 boxes, each containing 12 samples of the same grade of cotton. The 12 samples indicate the range of diversity allowed within the grade.

Standards for grading.—There has always been considerable confusion in the marketing of cotton, due to the fact that nearly every market had its own grades, and these were frequently changed to meet special crop conditions. In order to simplify cotton marketing by making a single set of standard grades, on which quotations and purchases and sales could be based, the United States Department of Agriculture was authorized in the appropriation bill for the fiscal year 1909 to prepare grade standards. Subsequent legislation enlarged these powers and authorized the sale of copies of the Official Cotton Standards to all who desired them. The United States Official Cotton Standards for grade have now been adopted by the exchanges of practically all the leading cotton markets of this country. Approximately 2,500 full and fractional copies of the standards have been sold to the American cotton trade. Copies have

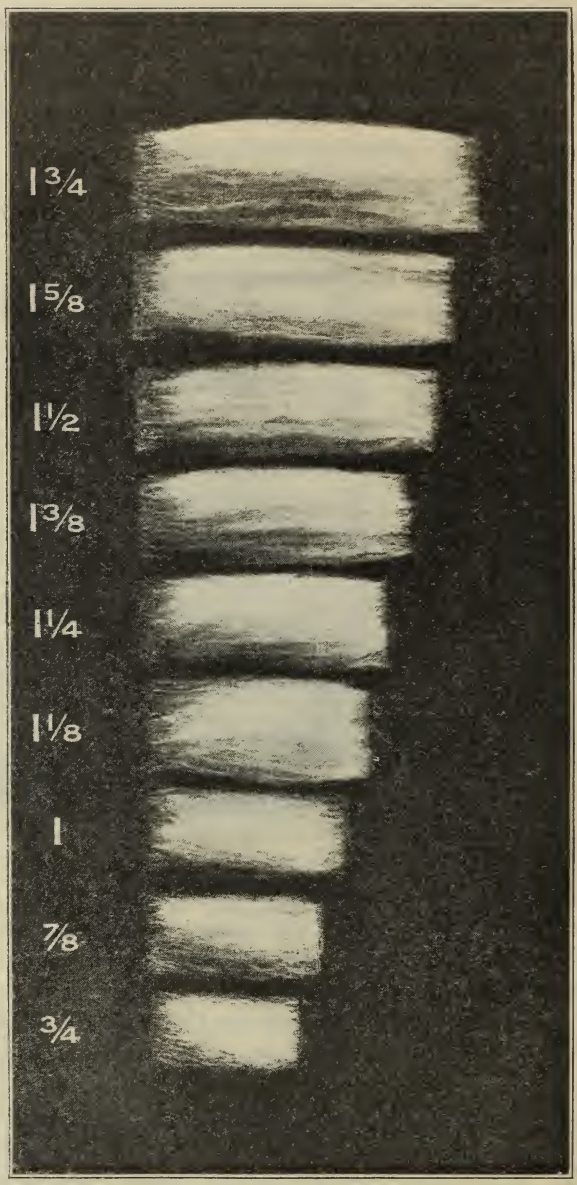


FIG. 39.—A photographic representation of the official cotton standards of the United States of those lengths of staple for which types are available for distribution, each respective length as shown being obtained from the original type bale.

also been sold into practically all the foreign markets. (See Fig. 38.)

Bolly cotton.—In the western and northwestern sections of the Cotton Belt large quantities of bolls, more or less matured, are frequently caught by early frosts which kill the plants and arrest the further development of the fibers. Such of these bolls as are not too severely damaged crack open and produce a cotton of poor character, fluffy and soft, and filled with shale, or the finely divided smooth inner surface of the carpel, which adheres closely to the fibers and causes waste during spinning. So much of such cotton has been caught by frosts in recent years that steps have been taken to salvage as much as possible. These frost-opened bolls are gathered and put through machinery which first picks the cotton from the bolls and then gins the cotton. The lint thus obtained is known as "bolly cotton" and brings only a fractional part of the price of well-matured white cotton.

Snaps.—Recently still another type of cotton has appeared in the West. It is known as "snaps," and its name is significant of its character. Owing to labor shortages, fields of mature cotton are sometimes left unpicked until late fall or winter. It is then much easier, especially if the weather be cold, to snap the bolls off of the plants than to pick the cotton. The "picking" is done later by machinery, and the cotton is then ginned and baled in the usual manner. While this cotton is fully matured, it is likely to be discolored and trashy. Snaps or snapped cotton also brings a lower price than regular cotton, but its spinning value is above that of bolly cotton.

Linters.

All cultivated varieties of cotton, with the exception of Sea Islands and some Egyptians, produce two types of fibers on their seed coats—a long fiber suitable for spinning and a short, somewhat weaker, fiber usually called fuzz. The long fibers are removed and baled at the gins and constitute the cotton of commerce, while the short fibers, or fuzz, are removed in a second and more intense ginning known as "delinting" or "cutting" and constitute what are known as linters. Delinting is generally done at cotton-oil mills as a step in the preparation of the seed for crushing. Linters also contain varying amounts of the long fibers that have escaped

through the gins without being removed. Linters are packed in bales similar to the ordinary cotton bale and weigh on an average about 500 pounds to the bale. The production of linters has increased from 114,000 bales in 1899–1900 to 440,000 bales in 1920–21. In 1916–17, during the World War, 1,331,000 bales of linters were cut, to be used chiefly in the production of explosives. The annual production of linters during the last 20 years, together with the ratio of linter production to cotton production, is shown in the accompanying table:

Annual production of linters.

Year.	Bales of linters.	Per cent of cotton crop.	Year.	Bales of linters.	Per cent of cotton crop.
1899–1900	114,000	1.2	1910–11	398,000	3.2
1900–1901	143,000	1.4	1911–12	556,000	3.4
1901–2	166,000	1.5	1912–13	602,000	4.2
1902–3	196,000	1.8	1913–14	629,000	4.2
1903–4	195,000	1.9	1914–15	856,000	5.3
1904–5	245,000	1.7	1915–16	931,000	8.3
1905–6	230,000	2.0	1916–17	1,331,000	10.9
1906–7	322,000	2.3	1917–18	1,126,000	10.0
1907–8	268,000	2.3	1918–19	929,000	7.7
1908–9	346,000	2.5	1919–20	608,000	5.4
1909–10	313,000	2.9	1920–21	440,000	3.3

Uses of linters.—During war time linters are used chiefly in the manufacture of explosives, but during peace time the felting quality of linters and the chemical composition of the fibers are utilized in the manufacture of a variety of articles, as shown in the following list:

Batting.
Wadding.
Stuffing material for:
  Pads.
  Cushions.
  Comforts.
  Horse collars.
  Mattresses.
  Upholstery.
Absorbent cotton.
Mixing with shoddy.
Mixing with wool in hat making.
Mixing with lamb's wool for fleece-lined underwear.
Felt.
Low grade yarns:
  Lamp and candle wicks.
  Twine.
  Rope.
Low grade yarns—Continued.
  Carpets.
Cellulose:
  Writing paper.
  Guncotton, nitro-cellulose.
    Pyrocellulose.
    Smokeless powder.
    Pyroxylin.
      Varnishes—
        Coating for metals.
        Artificial leather.
        Weatherproofing.
      Plastics—
        Celluloid.
        Collodion.
        Varnishes.
        Artificial silks.
        Photographic films.

Cotton Markets.

A cotton market may be defined as a place where a number of men meet to buy and sell cotton. The system begins with the village or town where dealer meets producer and ends with the point where dealer delivers to spinner. The trading may be in actual cotton or in contracts for future delivery. The term "spot cotton" is used to designate actual cotton on the market, and a "spot market" is one dealing

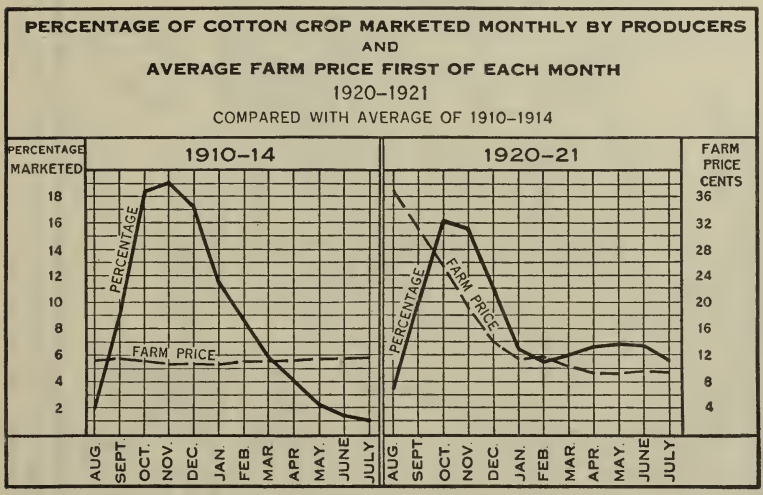
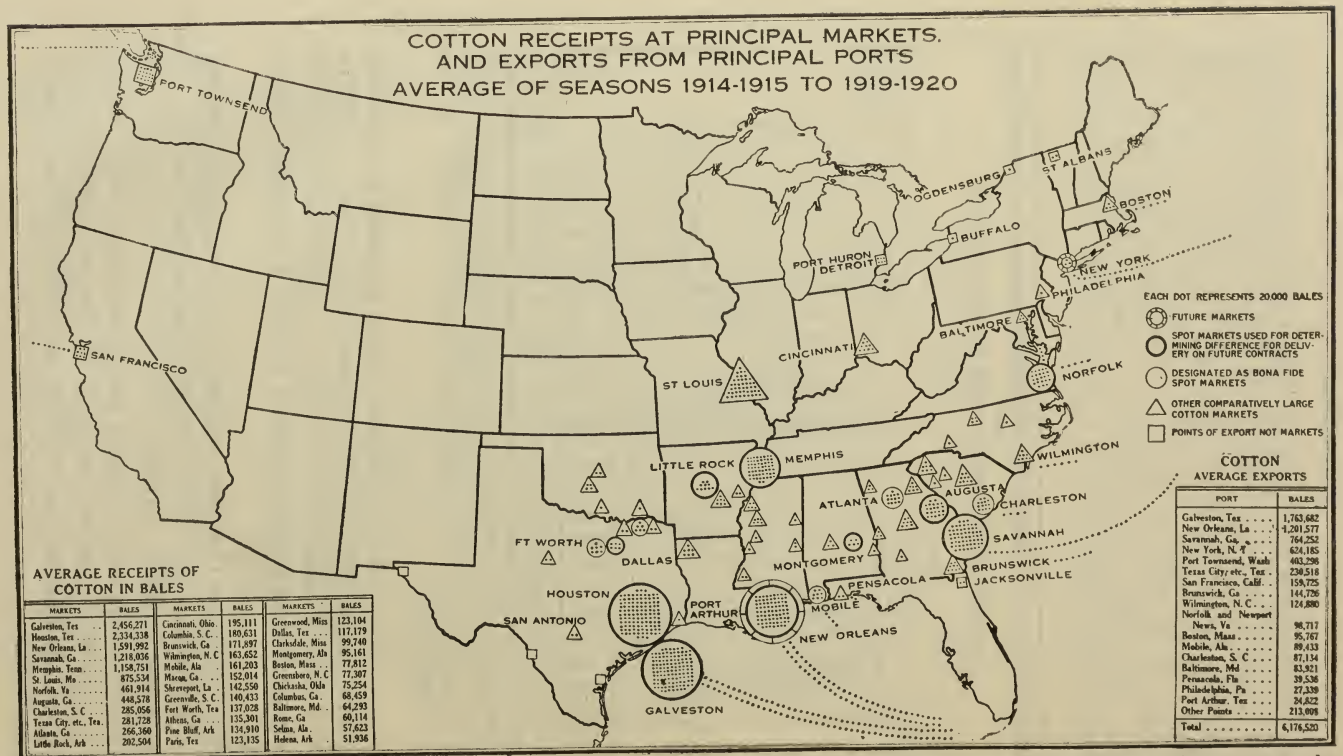


FIG. 40.—A large proportion of the cotton crop is annually marketed September to January, inclusive. This heavy marketing ordinarily depresses the farm price, which rises slowly as the marketing diminishes. Last year (1920–21) deflation, business depression, and a large carry-over of stocks caused the farm price to fall almost continuously from August to May of the following year.

in spot or actual cotton. In the future markets the trading is done in contracts to deliver at some future date. A future contract usually calls for 100 bales or approximately 50,000 pounds of cotton to be delivered during a specified future month.

Spot markets.—The spot markets are classified, according to their location and their functions in cotton trading, as primary and interior markets.

Primary markets are villages and towns where baled cotton is first put on the market and sold by the producer. Cotton buyers go into almost every village and town where a ginnery is to be found.



AVERAGE RECEIPTS OF COTTON IN BALES

MARKETS	BALES	MARKETS	BALES	MARKETS	BALES
Galveston, Tex	2,456,271	Cincinnati, Ohio	195,111	Greenwood, Miss	123,104
Houston, Tex	2,334,338	Columbia, S. C.	180,631	Dallas, Tex	117,179
New Orleans, La	1,591,992	Brunswick, Ga	171,897	Clarksdale, Miss	99,740
Savannah, Ga	1,218,036	Wilmington, N. C	163,652	Montgomery, Ala	95,161
Memphis, Tenn	1,158,751	Mobile, Ala	161,203	Boston, Mass	77,812
St. Louis, Mo	875,534	Macon, Ga	152,014	Greensboro, N. C	77,307
Norfolk, Va	461,914	Shreveport, La	142,550	Chickasha, Okla	75,254
Augusta, Ga	448,578	Greenville, S. C	140,433	Columbus, Ga	68,459
Charleston, S. C	285,056	Fort Worth, Tex	137,028	Baltimore, Md	64,293
Texas City, etc., Tex	281,728	Athens, Ga	135,301	Rome, Ga	60,114
Atlanta, Ga	266,360	Pine Bluff, Ark	134,910	Selma, Ala	57,623
Little Rock, Ark	202,504	Paris, Tex	123,135	Helena, Ark	51,936

COTTON AVERAGE EXPORTS

PORT	BALES
Galveston, Tex	1,763,682
New Orleans, La	1,201,577
Savannah, Ga	764,252
New York, N. Y	624,185
Port Townsend, Wash	443,298
Texas City, etc., Tex	230,518
San Francisco, Calif	159,725
Brunswick, Ga	144,726
Wilmington, N. C	124,880
Norfolk and Newport News, Va	98,717
Boston, Mass	95,767
Mobile, Ala	89,433
Charleston, S. C	87,134
Baltimore, Md	83,921
Pensacola, Fla	39,536
Philadelphia, Pa	27,339
Port Arthur, Tex	24,822
Other Points	213,098
Total	6,176,520

FIG. 41.—Cotton markets are "spot markets" to the extent they deal in acutal cotton on hand. New York and New Orleans are also future markets, the former dealing principally in "futures." Galveston, New Orleans, and Savannah are the most important export points.

Interior markets are large towns and cities where cotton from primary markets is received and sold by primary buyers to merchants or mill agents. Such markets are usually the points of concentration for grading, compressing, assembling in commercial lots, and consigning to destination for consumption.

Export markets.—The cities along the Atlantic and Gulf coasts where cotton is sold and from which it is exported are called export markets. About one-half of the American cotton crop is exported for consumption in foreign mills.

Consuming markets.—Cities or towns in which cotton is purchased for manufacturing are called consuming markets. Boston, New York, and Philadelphia are both export and important consuming markets.

Future markets.—There are future cotton markets or exchanges in New Orleans and New York. The importance of these markets is not indicated by their receipts or exports of cotton, as much of the cotton dealt in never reaches these points. New Orleans is both a spot market and a future market, while New York is primarily a future market. Liverpool is the most important foreign future market dealing in American cotton. There are future exchanges also at Bremen and Havre which deal in American cotton. The classification of all cotton delivered on the New York and New Orleans future exchanges is now done by the United States Department of Agriculture.

Marketing and Prices.

All of the markets are closely connected through the operations of dealers, and the future exchanges stand at the apex of the system, the prices quoted in all the other markets generally being based on the future quotations. (See Fig. 42.) When the harvest season begins, contracts covering a large part of the cotton crop have already been made and are being dealt in daily upon the future exchanges. While dealing in futures may be used for speculation, under normal conditions its chief use is for hedging, a means of insurance against loss and also for the stabilization of prices. The spinner who has made a contract to deliver cotton goods sometime in the future orders cotton from a responsible dealer, who "hedges" against a rise in the price of cotton, generally by buying a contract for it upon a future exchange.

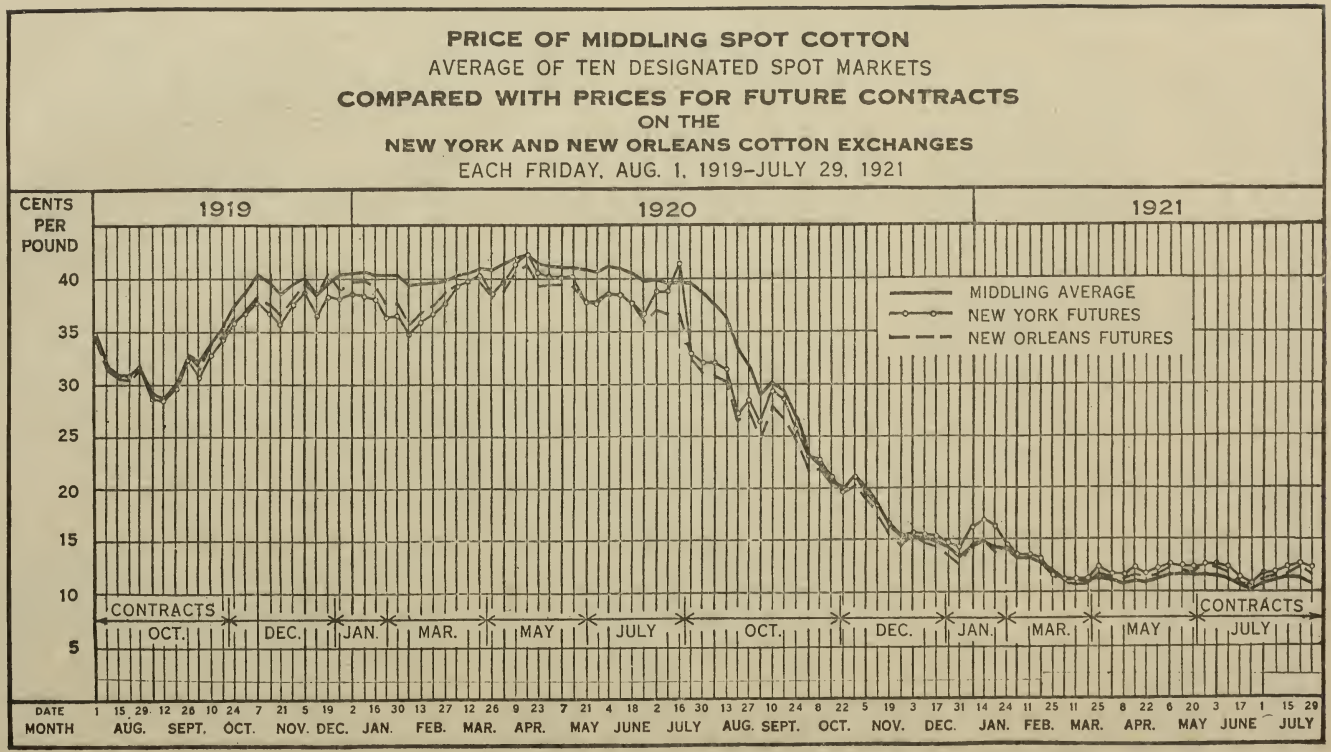


FIG. 42.—This chart shows the relation of price quotations for future contracts to the price of "spot cotton." Note that from September, 1919, to October, 1920, the spot price was nearly always higher than the future quotations, whereas from November, 1920, to July, 1921, the futures were generally above the cash.

On the other hand, the dealer who is buying or expects to buy cotton on the primary or other markets may "hedge" against a fall in prices by selling a contract for it upon a future exchange at a price sufficient to insure him against loss or even to make a profit. The purchase of cotton in quantity for any purpose without hedging would be considered such speculation that banks would not finance the deal. Dealers on the future cotton exchanges keep daily watch on the demand for cotton in all the important consuming markets and upon the conditions as to production and movement of cotton for the purpose of forecasting prices as far ahead as possible. Their forecasts guide them in their activities in buying and selling contracts for future delivery and the quotations of sales as they are made followed closely by dealers in the actual cotton on all spot markets.

Marketing cotton.—Buyers become active in the primary markets as soon as ginning begins. Some cotton is grown under mortgage and is sold promptly in order to meet pressing financial obligations. Where only small quantities of cotton are grown, it is usually sold to the ginner or local merchant in the nearest town or village. Through the center of the Cotton Belt the tenants on plantations, usually having pledged their crops in advance, sell at once to the owners of the plantations, or, subject to the lien, to merchants or buyers. With many producers, however, the time of selling is largely a matter of choice.

When cotton is bought in greater quantities than can be moved or consumed at once, the purchaser must bear the expense of storage and risk of loss, and he, therefore, pays the producer a lower price for it. On the other hand, the producer who can hold his crop must consider the expenses of storage, insurance, and interest on money involved in estimating the advantages of holding. It may be that in some cases the buyer can hold at less expense than the farmer and can afford to pay such a price that the farmer would lose by holding. Many successful farmers have adopted the fixed policy of selling a portion of their crop promptly and holding the remainder for sale as conditions and circumstances seem to warrant. The cotton sold under stress and of free choice soon after ginning forms a large percentage of the total crop. (See Fig. 40.)

It requires some time to assemble the cotton at the large primary and interior markets and to ship it to points of export and of consumption. Dealers move some of it as rapidly as possible, but hold some in storage at interior markets and concentration points so that they may deliver to spinners throughout the year. Spinners, as a rule, do not carry a very large supply of cotton on hand. The operations of the future exchanges enable dealers through hedging to buy and hold the cotton many months or to ship it a long distance without undue hazard from changes in prices.

Prices.—The basis for price quotations upon all the markets is the quotation for Middling on the nearest active future month upon the future exchanges. (See Fig. 43.) At each primary market a deduction from the price quotations must be made to cover expenses of handling and transportation. If there are many buyers on the market, grading may be fairly close and the prices paid close to the limit that will allow a reasonable profit to the buyer.

Prices in the large primary and interior markets are determined as in the smaller primary markets. However, grading has become standardized in these markets, and at each market the grades above and below Middling are settled for according to the differences prevailing in that market. The differences in price between Middling and the other grades and the premiums for the longer staples vary from time to time because of special demands or the effects of the season upon the supply of the different grades and lengths of staple.

The basis grade in future contracts is Middling and the price stated in the contracts is for that grade. When grades other than Middling are delivered the receiver pays for these grades so much above or below the contract price as the grades delivered are worth. Under the United States cotton futures act certain bona fide spot markets, designated by the Secretary of Agriculture, report daily to the future exchanges in the United States and to the Secretary of Agriculture the prevailing prices for Middling and the other grades "on" and "off" Middling (above or below Middling). New Orleans being also a spot market the differences in prices between Middling and the other grades of spot cotton in that market are used in determining the prices of cotton other than Middling when they are delivered on a

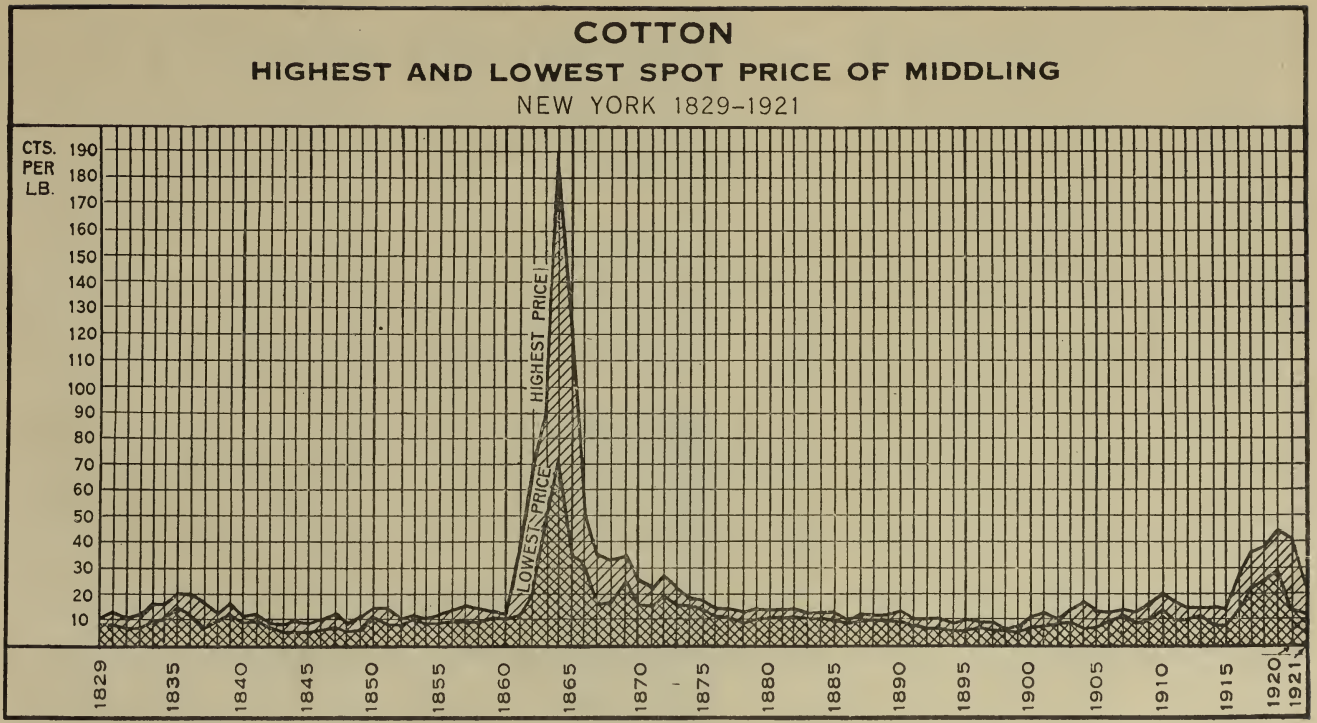


FIG. 43.—In the period of the recent war the price did not rise as high as in the Civil War period. One reason being that production continued and there was always available a good supply, whereas in the earlier period very little was produced and almost no cotton was available.

future contract in that market, whereas under the cotton futures act the New York cotton exchange uses the average differences "on" or "off" Middling as reported by the bona fide spot markets designated by the Secretary of Agriculture.

Transportation.

On the primary markets the miscellaneous assortments of grades and lengths of staple produced by the growers of cotton are purchased and forwarded to the interior markets, where they are assorted and assembled into lots, even running as to grade and other character, and offered to the purchasing agencies of the mills. Before forwarding to the mills, however, the cotton is compressed so as to conserve freight and mill storage space and to economize on freight charges.

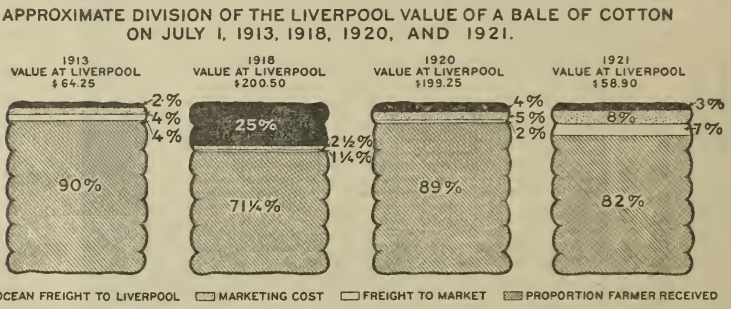


FIG. 44.—The farmer's share of the final market value of a bale of cotton varied greatly from time to time through the late war period. The cost of ocean transportation was large during the war but has shrunken nearly to the prewar share, whereas the rail transportation share has largely increased since the war.

Where there are no facilities for compressing the cotton at point of origin railroads accept it and have it compressed in transit. The charge for compressing averages about 12 cents per hundred weight. Additional charges are made for patching. These charges are added to the freight charges and collected by the railroad company. To secure through shipping rates all cotton is shipped to concentration points with reshipment privileges. When the cotton is to be reshipped the owner surrenders his receipts and it is forwarded to destination on the rate quoted from point of origin.

The Consumption of the Cotton Crop.

Approximately half of the crop is consumed in this country and the remainder is exported. In recent years mills in the cotton-growing States have taken more than half of the total quantity remaining in this country for consumption. Linters are mostly consumed at home. The tendencies are to expand the cotton manufacturing industries of the South and to manufacture more and more of the cotton near where it is grown.

Statistics and charts showing the annual distribution of the cotton crop of the United States follow.

Consumption of cotton in the United States, 1896–97 to 1920–21.

[Bales.]

Year.	United States.	All other States.	Cotton-growing States.	Year.	United States.	All other States.	Cotton-growing States.
1896–97	3,472,398	.....	.....	1909–10	4,621,742	2,388,236	2,233,506
1897–98	3,672,097	.....	.....	1910–11	4,498,417	2,249,282	2,249,135
1898–99	3,687,253	.....	.....	1911–12	5,129,346	2,493,468	2,635,878
1899–1900	3,873,165	2,349,997	1,523,168	1912–13	5,483,321	2,621,578	2,861,743
1900–1901	4,080,287	.....	.....	1913–14	5,577,408	2,652,114	2,925,294
1901–02	4,187,076	.....	.....	1914–15	5,597,362	3,026,969	2,570,393
1902–03	3,980,567	.....	.....	1915–16	6,397,613	2,870,085	3,527,528
1903–04	4,523,208	.....	.....	1916–17	6,788,505	2,900,157	3,888,348
1904–05	4,877,465	.....	.....	1917–18	6,566,489	2,869,391	3,697,098
1905–06	4,909,279	2,535,702	2,373,577	1918–19	5,765,936	2,566,909	3,199,027
1906–07	4,984,936	2,573,943	2,410,993	1919–20	6,419,734	2,836,815	3,582,919
1907–08	4,539,090	2,351,994	2,187,096	1920–21	4,892,672	1,895,201	2,997,471
1908–09	5,091,534	2,581,321	2,510,213				

The statistics given in the above table were compiled from reports of the Bureau of the Census. Those for the period 1896–97 to 1913–14, inclusive, are for the 12 months ending August 31. Those for the period 1914–15 to 1920–21, inclusive, are for the 12 months ending July 31. Those for the years 1896–97 to 1904–5, inclusive, except the year 1899–1900, are for equivalent 500-pound bales. Those for the year 1899–1900 and for the period 1905–6 to 1920–21, inclusive, are for running bales, except that round bales are counted as half bales and foreign cotton in equivalent 500-pound bales. Linters are included for the years 1896–97 to 1907–8, inclusive, but are excluded for the years 1908–9 to 1920–21, inclusive.

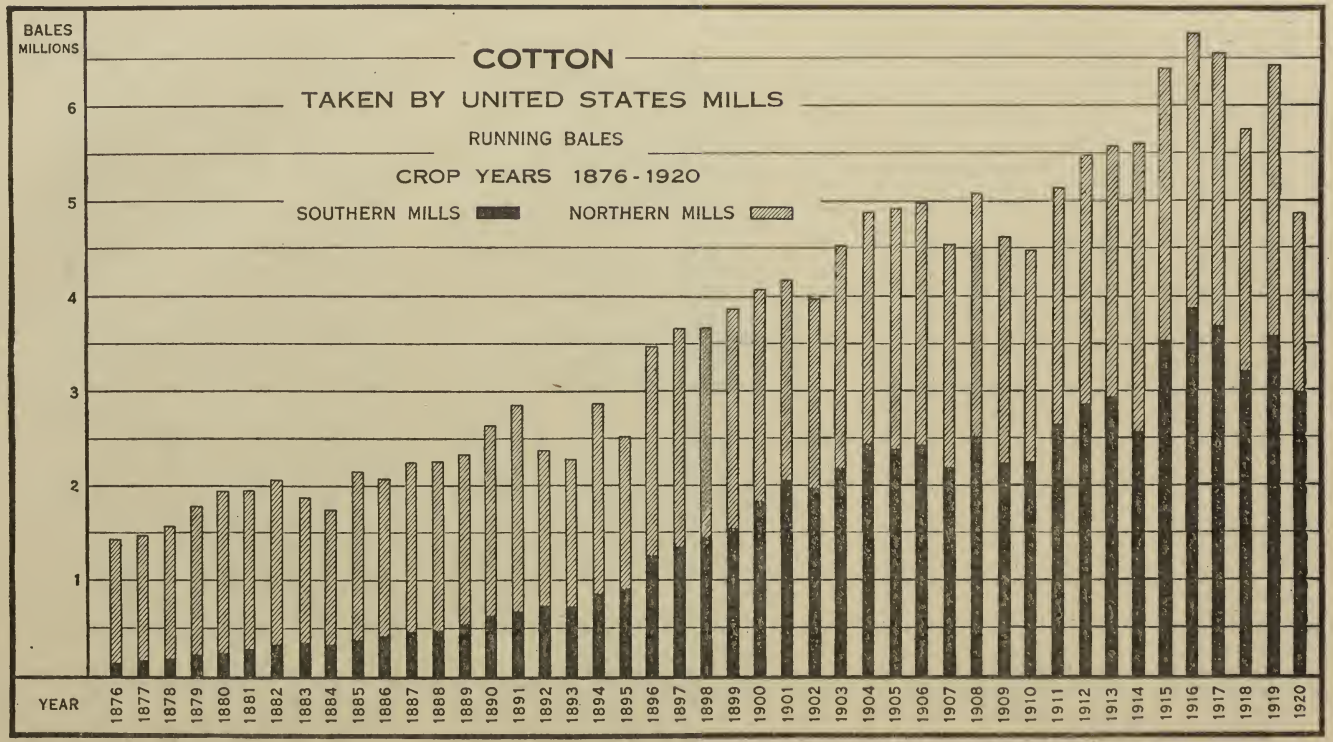


FIG. 45.—The consumption of raw cotton by the mills of the United States increased constantly from 1876 to 1916. The business depression last year caused a great reduction in mill consumption. The southern mills now use more than half the amount consumed in the United States.

The consumption of linters in the United States, by seasons, for the seasons 1908–9 to 1920–21 is given below. The figures for the seasons 1908–9 to 1913–14, inclusive, are for the 12 months ending August 31. Those for the seasons 1914–15 to 1920–21, inclusive, are for the 12 months ending July 31.

Linters consumed.

[Bales.]

Year.	United States.	Cotton-growing States.	All other States.	Year.	United States.	Cotton-growing States.	All other States.
1908–9	149,185	43,584	105,601	1915–16	880,916	449,602	431,314
1909–10	177,211	58,827	118,384	1916–17	869,702	446,659	423,043
1910–11	206,561	79,352	127,209	1917–18	1,118,840	716,954	401,886
1911–12	238,237	76,345	161,892	1918–19	457,901	291,981	165,920
1912–13	303,009	98,775	204,234	1919–20	342,473	131,484	210,989
1913–14	307,325	98,121	209,204	1920–21	516,307	154,483	361,824
1914–15	411,845	166,384	245,461				

Supply and distribution of cotton in the United States.

[Linters are included for the years 1905–6 to 1912–13, inclusive, but are excluded for the years 1913–14 to 1920–21.]

Year.	Supply.			Distribution.		
	Production, running bales, except round bales counted as half bales.	Carry over from previous year.	Imports, equivalent 500-pound bales.	Exports, running bales, except round bales counted as half bales.	Consumption, running bales, except round bales counted as half bales.	Stocks on hand at end of year.
1905–6	10,656,498	1,934,548	133,464	6,763,041	4,909,279	1,349,139
1906–7	13,097,992	1,349,139	202,733	8,503,265	4,984,936	1,514,567
1907–8	11,527,833	1,514,567	140,869	7,573,349	4,539,090	1,236,058
1908–9	13,418,144	1,236,058	165,451	8,574,024	5,240,719	1,483,585
1909–10	10,350,978	1,483,585	151,395	6,339,028	4,798,953	1,040,040
1910–11	12,384,248	1,040,040	231,191	7,781,414	4,704,978	1,375,031
1911–12	16,068,936	1,375,031	229,268	10,681,758	5,367,583	1,776,885
1912–13	14,159,078	1,776,885	225,460	8,800,966	5,786,330	1,648,438
1913–14	13,659,167	1,510,606	265,646	8,654,958	5,577,408	1,447,817
1914–15	15,905,840	1,365,864	363,595	8,322,688	5,597,362	3,936,104
1915–16	11,068,173	3,936,104	420,995	5,895,672	6,397,613	3,139,709
1916–17	11,363,915	3,139,709	288,486	5,302,848	6,788,505	2,720,173
1917–18	11,248,242	2,720,173	217,381	4,288,420	6,566,489	3,450,188
1918–19	11,906,480	3,450,188	197,201	5,592,386	5,765,936	4,286,785
1919–20	11,325,532	4,286,785	682,911	6,545,326	6,419,734	3,563,162
1920–21	13,270,970	3,563,162	226,321	5,673,452	4,892,672	6,590,359

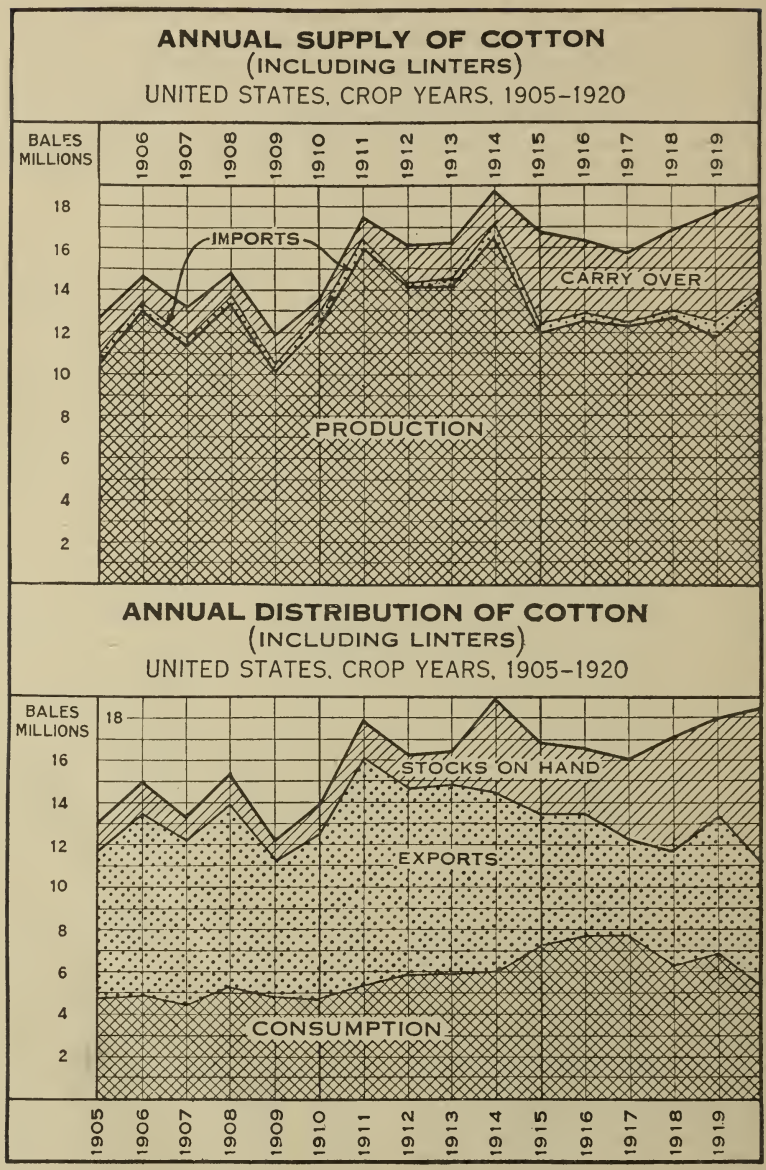


FIG. 46.—In recent years the carry-over from one crop season to another has been large. The total amount available for the year 1920–21 was greater than for any previous year except 1914–15. Before the war the United States annually exported more cotton than was consumed, but since 1914 exports have been less than home consumption.

Supply and distribution of linters in the United States.

[Figures for each season are for the 12 months ending Aug. 31, during the season 1905–6 to 1913–14, inclusive, and for the 12 months ending July 31, during the season 1914–15 to 1920–21.]

Year.	Supply.			Distribution.		
	Production, running bales, except round bales counted as half bales.	Carry over from previous year.	Imports, equivalent 500-pound bales.	Exports, running bales, except round bales counted as half bales.	Consumption, running bales, except round bales counted as half bales.	Stocks on hand at end of year.
1905–6	230,497	.....	.....	.....	.....	.....
1906–7	322,064	.....	.....	.....	.....	.....
1907–8	268,060	.....	.....	.....	.....	.....
1908–9	346,126	.....	.....	.....	149,185	.....
1909–10	313,478	.....	.....	.....	177,211	.....
1910–11	397,628	.....	.....	.....	206,561	.....
1911–12	556,276	.....	.....	.....	238,237	.....
1912–13	602,324	.....	.....	.....	303,009	137,832
1913–14	631,153	137,832	.....	259,881	307,325	181,584
1914–15	832,401	181,584	.....	221,875	411,845	388,786
1915–16	944,640	388,786	.....	295,438	880,916	263,547
1916–17	1,300,163	263,547	.....	436,161	869,702	453,659
1917–18	1,096,422	453,659	.....	187,704	1,118,840	439,917
1918–19	910,236	439,917	.....	71,534	457,901	868,897
1919–20	595,093	868,897	.....	53,021	342,473	1,009,650
1920–21 [1]	439,637	1,009,650	.....	51,132	516,307	684,298

[1] Subject to possible correction.

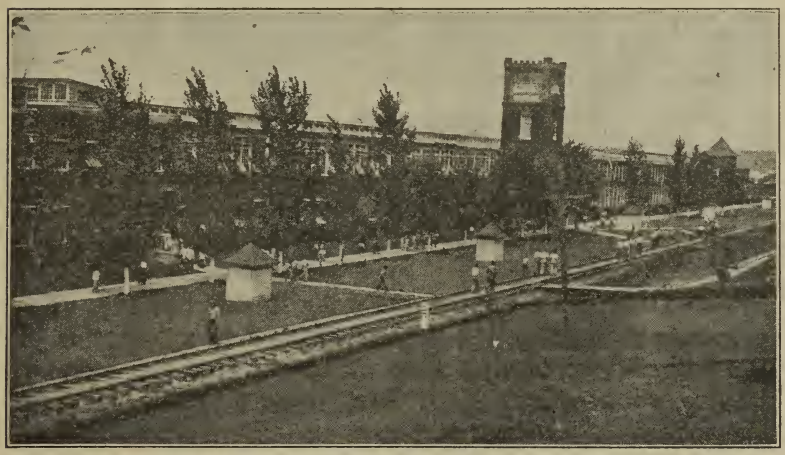
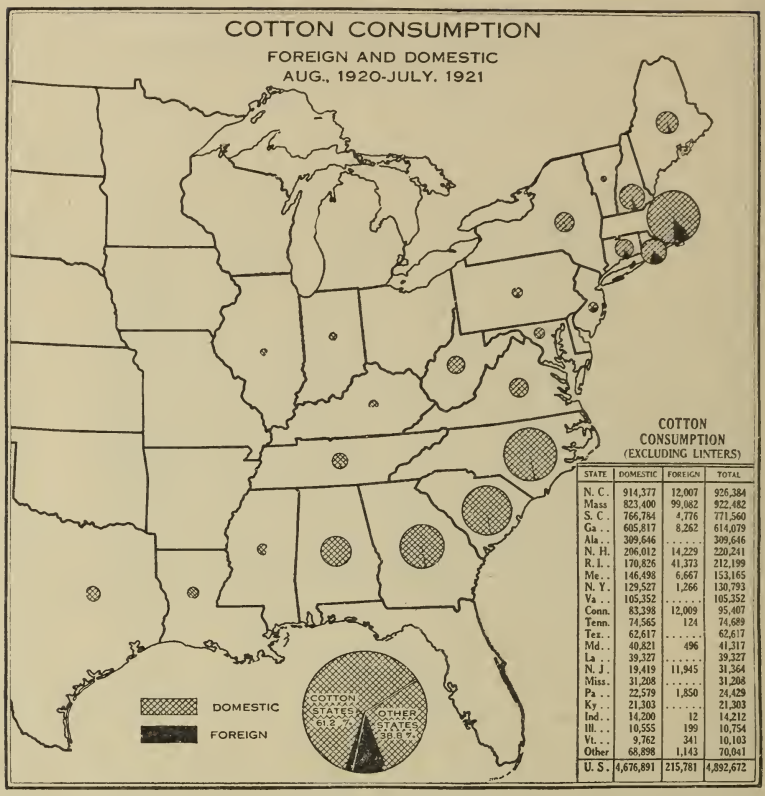


FIG. 47.—Noon hour at a modern southern cotton mill.



COTTON CONSUMPTION (EXCLUDING LINTERS)

STATE	DOMESTIC	FOREIGN	TOTAL
N. C.	914,377	12,007	926,384
Mass	823,400	99,082	922,482
S. C.	766,784	4,776	771,560
Ga.	605,817	8,262	614,079
Ala.	309,646	.....	309,646
N. H.	206,012	14,229	220,241
R. I.	170,826	41,373	212,199
Me.	146,498	6,667	153,165
N. Y.	129,527	1,266	130,793
Va.	105,352	.....	105,352
Conn.	83,398	12,009	95,407
Tenn.	74,565	124	74,689
Tex.	62,617	.....	62,617
Md.	40,821	496	41,317
La.	39,327	.....	39,327
N. J.	19,419	11,945	31,364
Miss.	31,208	.....	31,208
Pa.	22,579	1,850	24,429
Ky.	21,303	.....	21,303
Ind.	14,200	12	14,212
Ill.	10,555	199	10,754
Vt.	9,762	341	10,103
Other	68,898	1,143	70,041
U. S.	4,676,891	215,781	4,892,672

FIG. 48.—The mills in the cotton-growing States took 61 per cent of the total taken by the United States mills. Massachusetts, North Carolina, South Carolina, and Georgia are the leading States. Most of the foreign cotton was taken by the mills of New England.

Cotton Exports.

The average annual exports of cotton previous to the late war were about 60 per cent of the crop. During the war period the United States consumed the larger proportion of the crop produced. In some years more than one-half the crop was consumed by the mills in this country. The economic depression of last year resulted in a reduction of the mill consumption at home. Exports were also reduced, leaving an unusually large carry over, 6,590,000 bales, or one-half of the production.

The movements of cotton through ports and to foreign countries are indicated by the accompanying charts. The

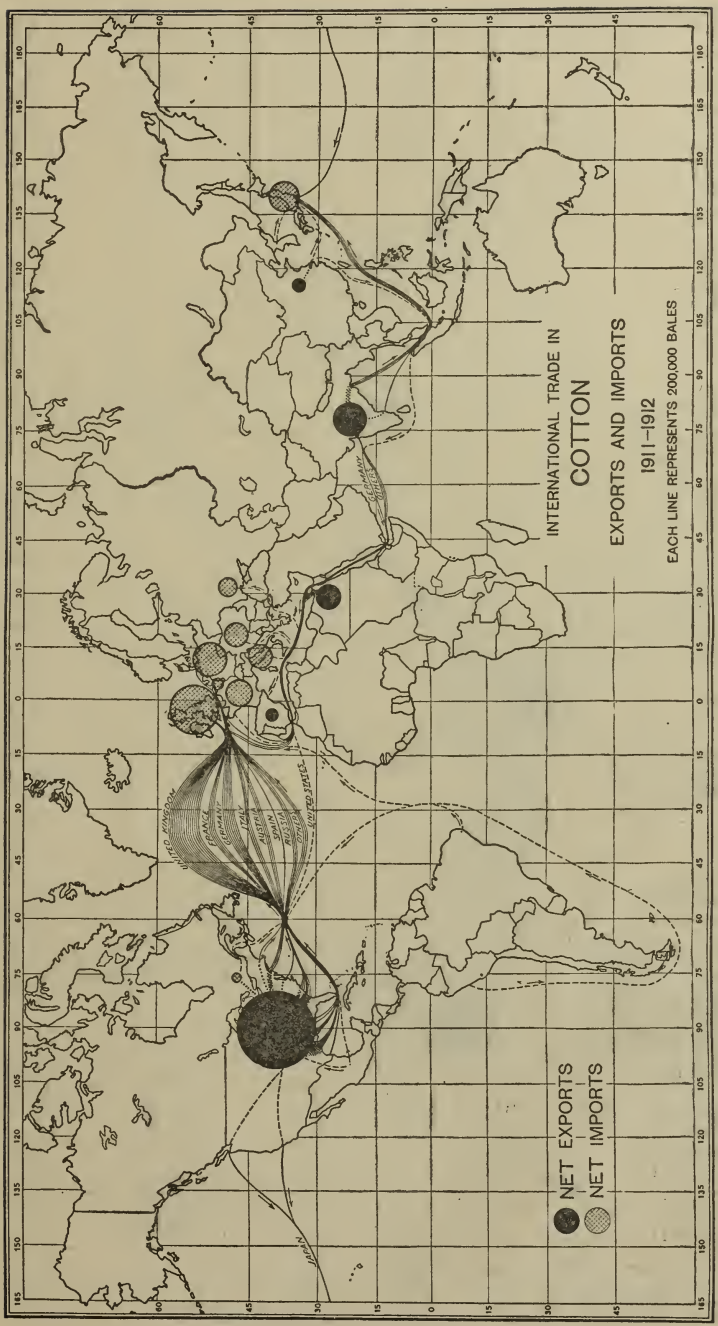


FIG. 49.—The predominant position of the United States in the international cotton trade is graphically shown in this chart.

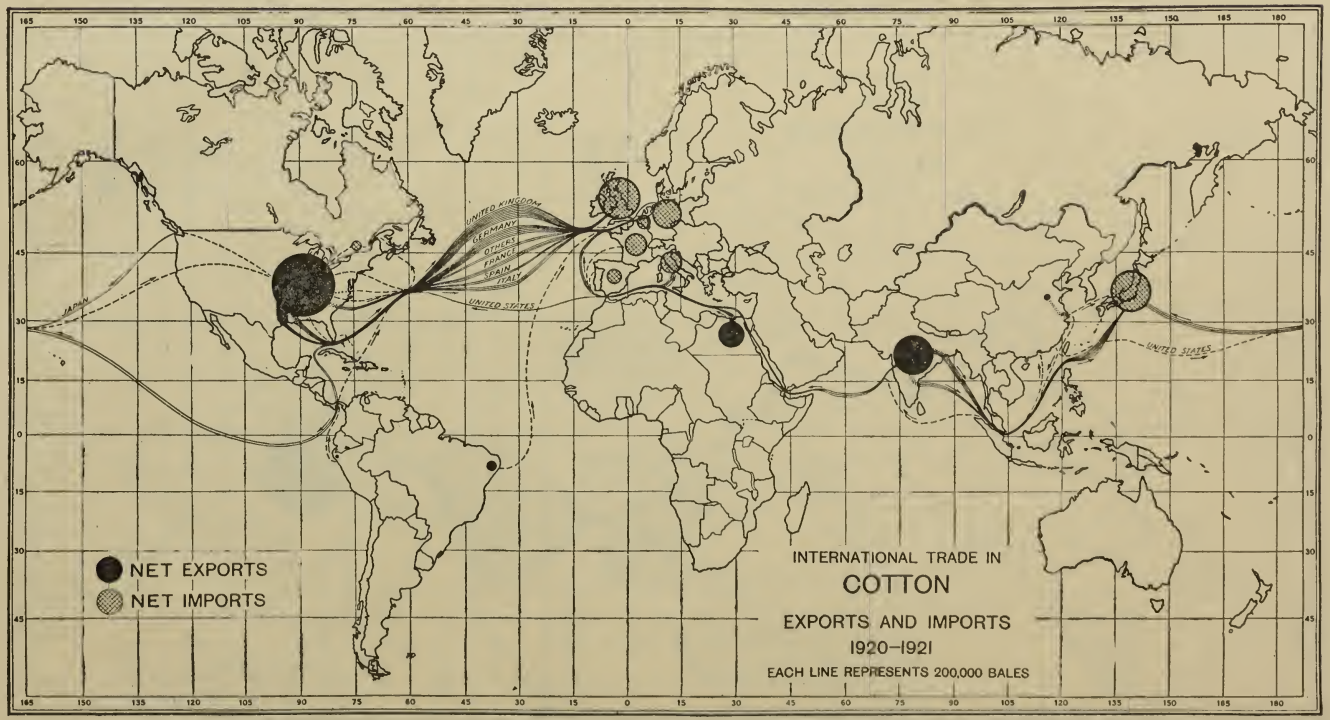


FIG. 50.—Note the changes in movements between the pre-war period and last year. Austria-Hungary and Russia were out of the market last year. Only Japan shows enlarged imports.

war disturbed cotton movements by making transportation expensive and shutting out from our markets some of the foreign countries that were taking cotton. On the other hand, in Japan there has been a great increase in the manufacture of cotton, and Japan has become one of the most important markets for the raw cotton of the United States.

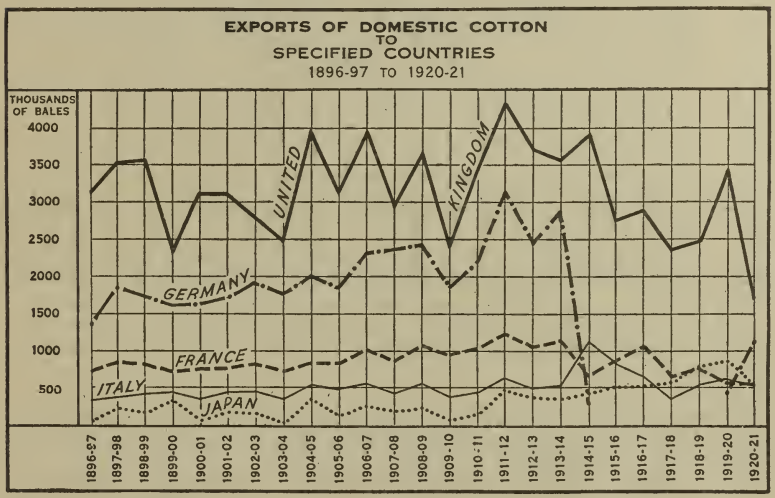


FIG. 51.—The United Kingdom is the best customer of the United States; Germany was second. Japan is becoming one of the principal importers of American cotton. In recent years there has been a very rapid expansion of manufacturing in Japan.

Utilization of Cotton Seed.

The utilization of the cotton seed has become an important economic factor in the production of cotton. At first planters commonly considered all of the seed as waste material, except that used for planting, but as soon as they began to give some attention to maintaining the fertility of their soils they found the seed valuable fertilizing material. Befor the Civil War experiments were being made in feeding the seed to live stock and crushing it for oil. In 1859 there were seven establishments in the United States engaged in the manufacture of cottonseed products. After the Civil War there was a great demand for fertilizers in the eastern States of the Cotton Belt, and the cotton seed was almost universally used for this purpose. In 1875 refined cottonseed oil was put on the New Orleans market, and since then

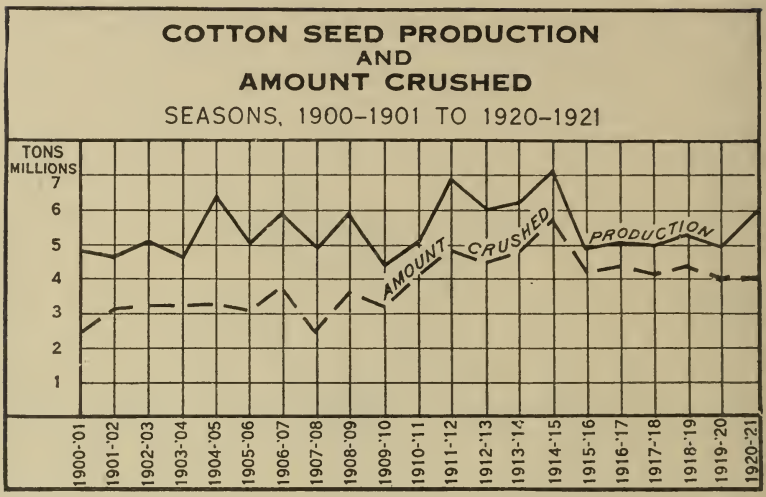


FIG. 52.—The amount of cotton seed produced, of course, varies with the cotton crop. Recently developed valuable uses for the seed products and high prices for the seed have caused an increasing proportion of the production to be crushed.

the cottonseed oil industry has developed with remarkable rapidity. Increased demand for the various products of the crushed seed has greatly increased the value of the seed.

Deterioration in Quality of the American Cotton Crop.

According to the testimony of the cotton trade in Europe as well as in the United States, the quality of the American cotton crop has deteriorated in recent decades. This can be understood when account is taken of the general custom among the American growers of planting many different varieties in the same locality, the crossing of these varieties in the field, mixing the seed at the public gins, and the general use of this ordinary "gin-run" seed for planting.

The extent of mixing of seed at gins has not been appreciated. Recent experiments have shown that modern ginning machinery retains a large amount of seed from each customer and passes it on to the next. No less than 26 per cent of the seed delivered to the farmer at public gins, as ordinarily operated, may be seed of another variety ginned for the previous customer. It is apparent that if such seed is planted there must be a vast amount of mixing in the field, and deterioration begins.

The degeneration that results from crossing in the field no doubt is the basis for the popular idea that cotton varieties "run out" in a few years and that "fresh seed" must be brought in from other districts. The fact is, however, that locally selected seed of good varieties has proved better than the new stock and some of the best-known varieties have been grown continuously in the same districts for many years, with no indication of "running out" as long as isolation, selection, and clean ginning are maintained.

Lack of discrimination on the part of buyers in the primary markets is also a serious factor in the deterioration in quality of the American cotton crop, and failure on the part of buyers to recognize superior quality when dealing with the growers has had the natural effect of leading farmers to believe that the most desirable character that a cotton variety can have is that of giving a high percentage of lint or "large outturn at the gin." Most of the varieties with high lint percentages produce short and inferior fiber and have small seeds, yielding a low percentage of oil, but such varieties are likely to be planted so long as the farmer receives as much for three-quarter or seven-eighths inch cotton as he does for 1-inch cotton.

Danger from Foreign Competition.

Very active efforts are already being made to establish or to extend the production of cotton in many foreign countries. Though such efforts in the past have not resulted in serious injury to the cotton industry of the United States, every season of high prices stimulates greater activity in other countries. Disturbed conditions during the war period resulted in the suspension of some of these efforts, but there is every possibility that important centers of cotton production will be developed in other parts of the world within the next few years.

Many representatives of foreign governments have come to the United States in the last few years to study the American cotton industry. They have come from Russia, China, Japan, India, the British colonies in Africa, Brazil, Argentina, Peru, and other countries. Foreign governments are also employing American experts and are purchasing large supplies of seed of improved American varieties.

The effect of such competition abroad will be felt first by the American producers of low-quality, short-staple cotton. Manufacturers in the United States had begun to import inferior cotton from India and China before the war, and though such importations may not become a regular custom, in any event they call attention to the fact that fiber of inferior quality is already being produced in foreign countries more cheaply than in the United States.

Since a large part of the American cotton crop is exported to other countries, the only adequate protection against foreign competition is to improve our own industry by growing better cotton and by growing it more cheaply than other countries are able to do, notwithstanding lower wages of farm labor.

Improvement Through Utilization of Better Varieties.

Fortunately the American cotton farmer is not limited to the production of inferior fiber, even under boll weevil conditions. Instead of preventing the use of better varieties of cotton, the presence of the boll weevil makes the improvement of varieties still more important than ever before. In fact, the better methods of preparing and cultivating the land made necessary by the boll weevil provide more favorable conditions for the production of superior fiber.

There is available a series of early and prolific Upland varieties of cotton-producing fiber from 1 to 1¾ inches long, which are adapted to a wide range of conditions in the American Cotton Belt. With such varieties available, there are no agricultural reasons for continuing to produce cotton of less than 1-inch staple in the United States, and there does not appear to be any industrial or economic reason for continuing to produce the short and inferior fiber that now forms a large proportion of the American cotton crop.

Importance of One-Variety Communities.

Full utilization of improved varieties of cotton is possible only in communities devoted to the production of a single variety. Where communities are united upon a single superior variety of cotton and supplies of pure seed are maintained many of the farming problems are simplified. Cot-

ton growing is discussed with interest and profit at farmers' meetings because everybody has had experience with the same variety of cotton. With a full understanding of the behavior of one variety, methods are adjusted more closely to differences in soil, season, and time of planting, as well as to the control of insect pests and diseases, labor supplies, ginning, handling, warehousing, financing, and marketing of the crop.

The most rapid progress in American cotton culture has been made the last few years in the Salt River Valley of Arizona, where only the Pima variety of Egyptian cotton is grown. Single-variety communities are also developing rapidly in Texas, Oklahoma, California, and other States where millions of dollars in premiums have already been paid to farmers for superior cotton. Such progress is not possible in communities growing different kinds of cotton, where farmers usually ascribe their success or failure to the quality of the seed.

The essential feature is that the community should agreee upon the planting of one variety of cotton and take measures for maintaining the purity and uniformity of the stock by continued selection under the local conditions. This would mean larger crops, better fiber, and higher prices, not only because of the improved quality, but also because each community would be able to produce a commercial quantity, a hundred bales or upward, of the same uniform type of cotton.

Cooperative Warehousing and One-Variety Communities.

Realization of the enormous benefits to be derived from cooperative warehousing of cotton has led to the rapid organization in all of the principal cotton-growing States of farmers' associations to finance the building of centralized, fireproof warehouses for the proper storage and handling of their crop. Through such associations the farmer secures protection for his fiber from damage by fire or weather, his crop is marketed in an orderly manner, and a fair price is assured for the quality of cotton he produces.

Full benefits of such associations can not be realized, however, in communities growing many different varieties of cotton. Though the progressive farmer producing a superior

staple from selected seed may receive a premium for his cotton the first year of two, there would be no possibility of maintaining the high standard of his crop so long as his neighbors persisted in growing inferior cotton and ginning their crops on the same gin. Nor is it possible to receive a full price unless the superior fiber is available in the large commercial quantities that manufacturers require, and only one-variety communities can produce.

It is only in communities devoted to the growing of a single, superior variety and maintaining its quality and uniformity by persistent selection that full benefits may be realized from cooperative warehousing and a real improvement in the quality of the American cotton crop assured.

Summary of the Situation and Outlook.

The short crop of 1921 plus the large carry-over from 1920 gave the world a sufficient supply of cotton for the year 1921–22. Had there not been a very large carry-over from the crop of 1920 the low production of 1921 would have resulted in very high prices for cotton. Ordinarily a short crop in the United States should result in high prices, which would in some measure offset low yields. But the extraordinarily large carry-over from the crop of 1920 resulted in low prices to farmers with a very small crop. The situation was made worse by the industrial depression, which greatly reduced the demand for cotton by the mills of the United States as well as by manufacturers in foreign countries. In addition to these difficulties the South was further oppressed by high prices for fertilizers and high prices for almost everything else that the southern farmer had to buy. Notwithstanding that corn and other farm products in the North were very cheap southern farmers had to pay good prices for these products in the South because of the increased transportation costs. Taken together all of these factors produced a severe economic depression in the South.

Of course it is not expected that these conditions will continue long. The revival of the cotton-manufacturing industry in this country is strengthening the demand for cotton. There is reason to hope that the economic condition of foreign countries will also improve, so that the cotton-manu-

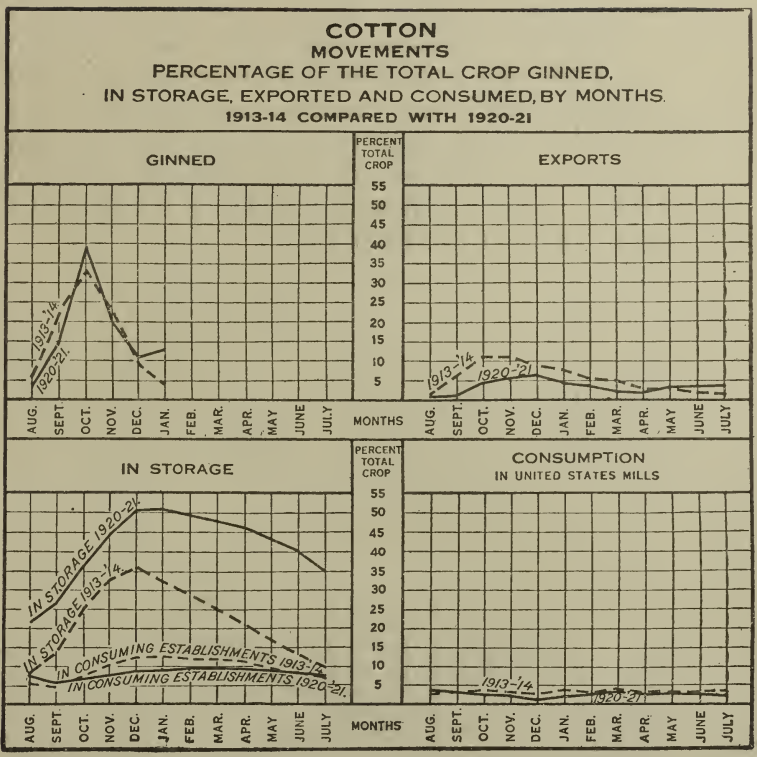


FIG. 53.—Ginning begins in July and ends in February; the amount in storage increases from August to December, inclusive; exports increase August to October or November; consumption in the United States mills is quite regular throughout the year. Movements last year differed from the pre-war average principally in the stocks in storage, which was largely owing to the unusually large carry-over from the previous year.

facturing industries will revive and the demand for goods manufactured in this country will increase. The burden upon the farmer of the South in making his purchases in the North has been somewhat lessened by a slight reduction in freight rates. Reductions in wages and in prices of things the farmer buys to produce the crop will result in a reduction in the cost of the crop. The carry-over of cotton from 1921–22 is much less than in previous years, so that unless there is a very large new crop of cotton to add to this carry-over the supply at the beginning of the year will be considerably less than the supply last year. Already the prospect for a reduction in supply and an increase in demand has resulted in better prices. The boll weevil continues

to be a very destructive pest, which there is as yet no prospect of eliminating. Farmers who have been in contact with it for some time have learned to reduce somewhat its destructiveness. Until more adequate measures of control or destruction of the pest have been developed it may be expected that the boll weevil will continue to do enormous damage to the crop from year to year, varying in destructiveness with the character of the season.

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